THE TRAPDOOR SPIDER *ARBANITIS* L. KOCH (IDIOPIDAE: MYGALOMORPHAE) IN AUSTRALIA

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The type species of *Arbanitis* L. Koch, 1874, *A. longipes* (L. Koch, 1873) is redescribed from the rediscovered holotype male; from new conspecific material, males and females are diagnosed, and their distribution, habitat, and burrow are described. Several somatically diagnosable populations from southeastern Queensland and northern New South Wales are also identified and their variation described. *A. longipes* fits the previous diagnosis of *Misgolas* Karsch, 1878. A cladistic analysis of some *Misgolas*, *Euoplos*, *Cataxia* and *Homogona* species and the new species described herein provides support for the continued maintenance of *Misgolas* along with its rediagnosis. *Arbanitis* is radically rediagnosed and now includes only the type species and two new species from the Macpherson Ranges (*A. robertcollinsi*) and northern New South Wales (*A. beaury*). Three new *Misgolas* species—*M. bithongabel*, from Lamington Plateau and two others, closely allopatric or sympatric (*M. echo*, *M. monteithi*), are also described. *Arbanitis*, as here defined, is the plesiomorphic sister group of other Australian idiopids; biogeographic derivation from that indicates that the *A. longipes* species-group arose on the Lamington Plateau (above 600m) and the lowland species (*A. longipes*) survives in habitats from rainforest to remnant open forest.

A key to Australian idiopid genera is provided. The process of matching conspecific males and females of sympatric congeners in somatically homogenous groups is discussed. Of the five new species, females of *Arbanitis robertcollinsi* and *Misgolas* species cannot be described because they are not confidently diagnosable; intervention of molecular methods to match them with conspecific males is proposed. *Misgolas pulchra* (Rainbow & Pulleine, 1918) is synonymised with *Arbanitis longipes*. Species previously included in *Arbanitis* (except *A. longipes*) are transferred to the resurrected *Euoplos* Rainbow, 1914; all New Zealand species are removed from the synonymy of *Arbanitis* and restored to *Cantuaria* Hogg. □ *Mygalomorphae, Idiopidae, Australia, biodiversity, rainforest.*

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Unlike most spiders commonly surveyed, the Mygalomorphae are long-lived and often subterranean. Mating maximally once each year and highly sedentary, they are ideal animals for surveys of soil and forest integrity, and especially effective for short-term surveys. Mygalomorphs, at least in northern and eastern Australia, are taxonomically better known than their araneomorph sisters. The exceptions are the ubiquitous Idiopidae.

Idiopids occur through most parts of Australia, notably absent from the far north and from Pacific islands including New Caledonia, but present in New Zealand and Tasmania (Raven, 1985). They have exploited the most diverse habitats—desert, open forest, rainforest, montane areas snow-covered in winter, mangrove and other nearby maritime habitats (Main, 1981; Churchill & Raven, 1992).

Among idiopids of eastern Australia is a group of spiders which are quite attractive and distinctive. The yellow brown carapace with a strongly arched caput contrasts with the stout yellow- to red-brown legs. The spiders build burrows in embankments with a thick plug door often encrusted with moss. These spiders have been placed in *Arbanitis* L. Koch, 1874 (e.g., Main, 1985a, b). A second idiopid, *Misgolas* Karsch, 1878, is the subject of ongoing studies (Wishart, 1992) but differs from species placed in *Arbanitis* by Main (1985a) in the relatively lighter build and slender brown hirsute carapace; many species have dark brown stripes or decorations on the retrolateral face of the pedal

FIG. 1. *Arbanitis longipes* (L. Koch, 1873): A, B, F, female habitus, dorsal (A), lateral (B), ventral legs showing decorations (F). C, D, burrow entrance in open forest Camira (C, E), D, embankment beside rainforest, "End of the World", Pine Mountain.

femora, patellae and tibiae and palp. One of us (GW) is revising *Misgolas* Karsch, 1878 and is finding a very diverse, new fauna. At present, the Australian complement of *Misgolas* numbers 19 species; the real complement is predicted to be about 6 times that (as Raven, 1988, had predicted would be the average difference between known and new species for all Australian spiders). So *Misgolas* is highly speciose.

L. Koch (1873) described *Pholeuon longipes*, from a single male from Bowen, northeastern Queensland. However, the generic name was

pre-occupied and was replaced by *Arbanitis* L. Koch, 1874. The genus remained monotypic until Hogg (1903) described *A. maculipes*, later synonymised with *A. annulipes* (C. L. Koch, 1841). Rainbow & Pulleine (1918) included seven species in *Arbanitis*. Of those, only two were retained by Main (1985a, b). In Main's studies on Australian idiopids (e.g. Main, 1985a, 1967), a concept of *Arbanitis* was formed in the absence of firsthand knowledge of the type species. The type specimen was considered lost (Main, 1985a, b). Despite this, her synonymy (Main, 1985a) of *Arbanitis* included eight other valid names (including two New Zealand genera) and was probably the largest generic synonymy in Australian spiders.

Unusual amongst Australian idiopids, the male of *A. longipes* lacks a tibial spur. Raven (1985) concluded that a tibial spur is plesiomorphic in the Idiopidae; hence, the absence of a spur in *A. longipes* must be considered a secondary loss. One of us (RJR) checked all collections in Australian museums for spur-less males assignable to *Arbanitis* (sensu Main) from northern Queensland (from Bowen, north). None were found but the sampling in the Bowen region could not be considered long term or intensive. Main (1985a) reported a similar failure to locate new material of *A. longipes*.

In June, 1998, RJR visited the Zoologisches Universitat und Zoologisches Museum, Hamburg, to examine problematical araneomorph taxa. The former curator, Dr Gisela Rack, had specific material set aside for examination. This was from the Godeffroy collection on which Ludwig Koch's pivotal publication, *Die Arachniden Australiens*, was based. The handwriting on the labels of that material had faded but the Godeffroy badge was still distinct. A number of specimens with such labels were examined but only two were then recognised: the holotype males (previously presumed lost) of *A. longipes* (L. Koch, 1873) and of *Habronestes spirafer* L. Koch, 1873. The latter will be dealt with elsewhere. In both cases, the definitive characters of the male from Koch's figures and descriptions were clear and faithfully illustrated.

The re-discovery of the holotype of *Arbanitis longipes* was met with considerable unease when it was noted that it bore very strong resemblance to species currently included in *Misgolas* and differed substantially from Main's (1985a) concept of *Arbanitis*. Hence, species (other than the type) previously included in *Arbanitis* by Main (1985a) required a separate generic name; the oldest available name for those species is *Euoplos* Rainbow, 1914.

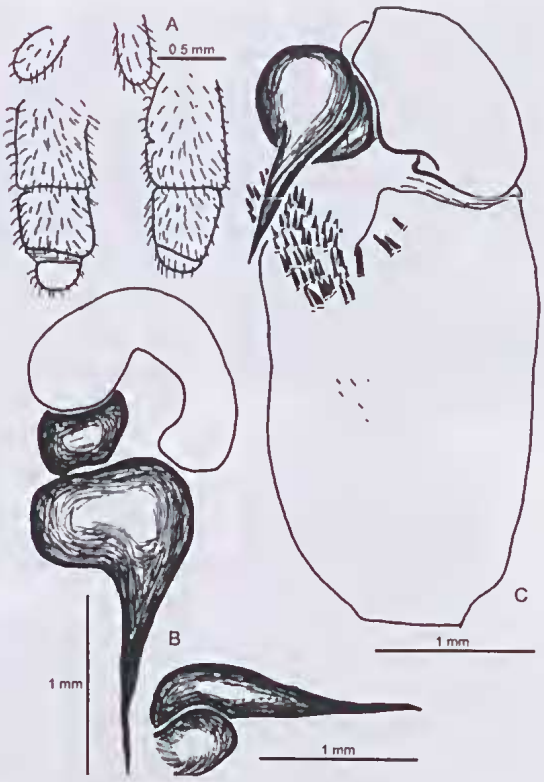

FIG. 2. *Arbanitis longipes* (L. Koch, 1873), holotype male: A, spinnerets, ventral view; B, palpal bulb, ventral and retrolateral view; C, palpal tibia, tarsus and bulb, retrolateral view.

The problem of difficult-to-recognise type species was not, however, confined to *Arbanitis*. The type species of *Misgolas*, *M. rapax* Karsch, 1878, has a badly damaged, dried female as holotype from New South Wales. As seen below, the problems of identifying females of closely related *Misgolas* are substantial and only compounded by the vague type locality and damaged holotype. Despite substantial knowledge of *Misgolas* from New South Wales, GW could only conclude that *M. rapax* is a species incertae sedis. However, GW was able to use some leg muscle of the holotype to extract DNA and match it against fresh specimens and males and establish the species identity of *M. rapax*.

The questions addressed here are whether *Misgolas* and the newly defined *Arbanitis* are congeneric, to which genus are the New Zealand species of *Misgolas* related, and what are the relationships of the groups. The potential effect of the change of names widened when Raven (1985) transferred all (New Zealand) species of *Cantuaria* Hogg, 1902 to *Misgolas*. We review the New Zealand Idiopidae elsewhere.

MATERIALS AND METHODS

Abbreviations are standard for the Mygalomorphae and are given in Raven (1994). Institutional acronyms are given with the acknowledgements.

SYSTEMATICS

Family IDIOPIDAE
Subfamily ARBANITINAE

KEY TO GENERA OF THE AUSTRALIAN ARBANITINAE

1. Fovea deeply procurved or U-shaped . . . . *Euoplos*, part
   Fovea not as above 2
2. Cuspules (female) or spinules (male) present on labium . 3
   Neither cuspules nor spinules present in either sex . . . 5
3. Cuspules extend for length of maxillae . . . . *Homogona*
   Cuspules confined to inner edge of maxillae 4
4. Rastellum of 3-4 large conical spines on distinct mound . . . . . *Blakistonia*, part
   Rastellum weak and not on mound, if present . . *Cataxia*
5. Eye group clearly wider in back 6
   Eye group distinctly wider in front than behind or parallel-sided 10
6. Dorsal abdominal sigilla present 7
   Dorsal abdominal sigilla absent 8
7. Dorsal abdomen with coriaceous corrugations . *Idiosoma*
   Dorsal abdomen not as above . . . . . *Aganippe*
8. Eye group roughly rectangular . . . . . *Euoplos*, part
   Eye group strongly trapezoidal, much wider behind than in front. 9
9. Carapace much longer than wide; caput low . . . *Anidiops*
   Carapace little longer than wide; caput steeply arched . . . . . *Eucyrtops*
10. Eye group about as long as wide . . . . *Blakistonia*, part
    Eye group clearly wider than long. 11
11. Carapace broad, females with strongly procurved fovea . . . . . *Euoplos*, part
    Carapace narrow (Fig. 3A), females with straight fovea 12
12. Males with long spines on palpal tibial apophysis . . . . . *Arbanitis*
    Males with short conical spines on palpal tibial apophysis . . . . . *Misgolas*

REMARKS. Subfamily diagnosis and distribution as in Raven (1985).

Arbanitis L. Koch, 1874

Pholeuon L. Koch, 1873: 471. Type species by monotypy *Pholeuon longipes* L. Koch, 1873 preoccupied by *Pholeuon* Hampe, 1856.
Arbanitis L. Koch, 1874: 491, replacement name for *Pholeuon* L. Koch, 1873.

DIAGNOSIS. Differs from *Cantuaria* in having plesiomorphic wide posterior book-lung apertures and from *Misgolas* and *Euoplos* in the rounded cymbial lobe, simple unadorned spiniform embolus, the long spines on the RTA and further from *Misgolas* in the absence both of a spur on tibia 1 and of a distal process on the retrolateral palpal tibia in males.

Species here attributed to *Arbanitis* are consistent in the subquadrate eye group shape which is narrower behind than in front; tarsi I, II of males never incrassate ventrally (as in *Euoplos*); labium always wider than long. No spines, spinules or cuspules on the labium.

TYPE SPECIES. *Pholeuon longipes* L. Koch, 1873 by monotypy.

REMARKS. All *Arbanitis* have a very uniform eye configuration: the eye group is clearly wider in front than behind, the PLE are clearly smaller than AME or ALE, the PME are tiny. That is also the case in some species of *Misgolas*. Using this diagnosis, it is not yet possible to distinguish females of *Arbanitis* from those of *Misgolas*.

DISTRIBUTION & HABITAT. *Arbanitis* is known only from southeastern Queensland, including the Lamington Plateau and just southwest of that area in northern New South Wales. Most localities are rainforest, wet sclerophyll or heath with some populations in open forest.

SPECIES INCLUDED. *Arbanitis longipes* (L. Koch, 1873), *Arbanitis robertcollinsi*, sp. nov., *Arbanitis beaury*, sp. nov.

Arbanitis longipes (L. Koch, 1873)
(Figs 1-4, 5A-D, 12, 13A)

Pholeuon longipes L. Koch, 1873: 472.
Arbanitis longipes L. Koch, 1874: 491; Hogg, 1901: 236, f. 24c; Rainbow, 1914: 213, f. 26-27; Main, 1985b: 18.
Arbanitis pulchellus Rainbow & Pulleine, 1918: 114 (presumed replacement name for *Arbanitis pulchra* Rainbow & Pulleine, 1918: 86, *nomen nudum*). NEW SYNONYMY.
Aname pulchra Rainbow & Pulleine, 1918: 153. First synonymised with *Arbanitis pulchellus* Rainbow & Pulleine, 1918 by Main, 1972: 100.
Misgolas pulchellus: Main, 1985b: 24.

TYPES. Holotype ♂, putatively "Bowen" here corrected to Camira, Brisbane (*Arbanitis longipes*), ZMH; holotype

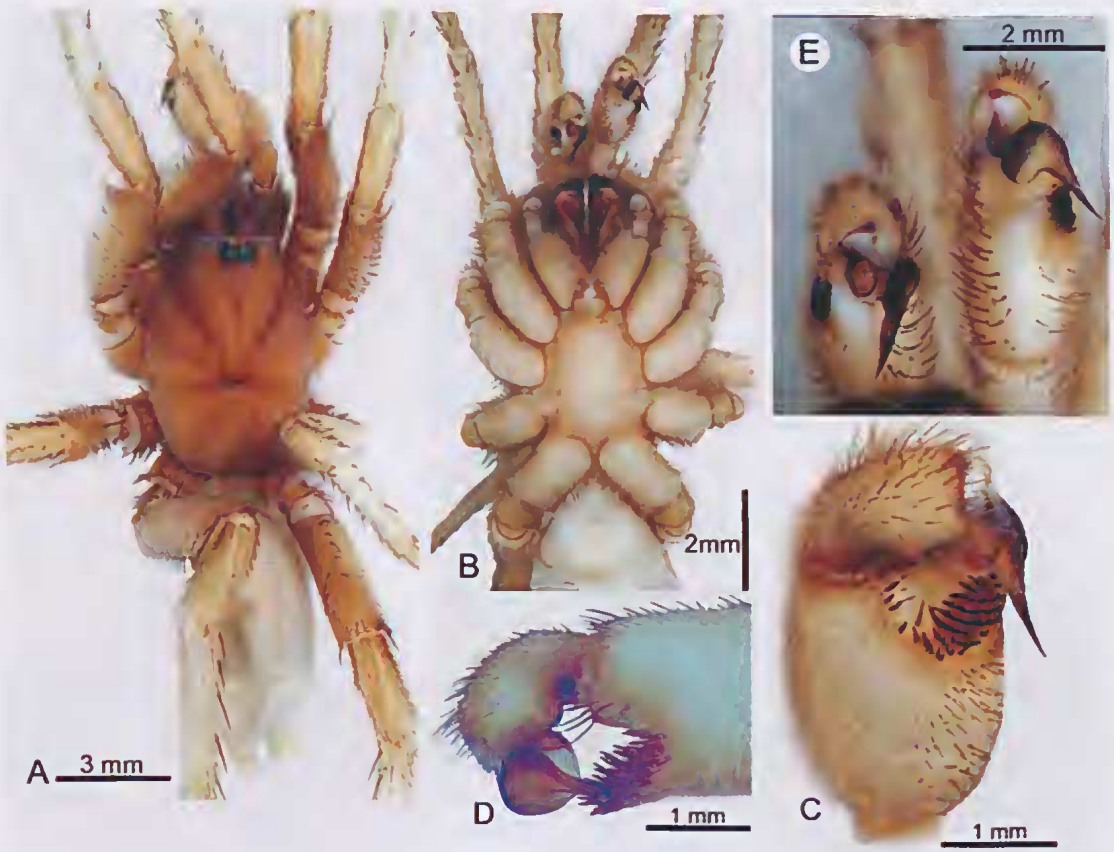

FIG. 3. *Arbanitis longipes* (L. Koch, 1873), holotype male: A, caparace and abdomen, dorsal view ; B, sternum, coxae and mouthparts, ventral view; C-E, palp and bulb, ventral (E), retrolateral distal showing lines of spines (D), and retrolateral view showing rounded cymbial lobe and RTA (C).

♂, Mt Tamborine, AM K40993, KS8375 (*Aname pulchra*), examined.

MATERIAL EXAMINED. QM S19519, 1 ♂, Beerwah Forestry Reserve, 26°51'S 152°57'E, M. Glover; QM S8909, 9041, 2 ♂♂, Bahrs Scrub, 27°45'S 153°10'E, rainforest, pitfall, 30 Apr 1980-29 Jan 1981, G & S. Monteith; QM S25921, 1 ♂, Camira, 27°37'S 152°55'E, 5 Nov 1994, A. Patterson; QM S20632, 2 ♂♂, Glen Witheren Main Scrub, 28°03'S 153°10'E, rainforest, pitfall and intercept traps, 3 Oct-31 Dec 1991, G. Monteith; QM S22410, S22412, 4 ♀♀, Enoggera, Army Lands, 27°26'S 152°58'E, 6 Jan 1994, T. B. Churchill; QM S54311, 54313, 2 ♂♂, The Knobby, 4km west of Glamorgan Vale, 27°30'S 152°35'E, semi-evergreen vine thicket, pitfall, 13 Jan-16 May 1999, G. Monteith; QM S6709, ♀, Mt Cotton, nr Venmans Reserve, 27°37'S 153°13'E, Feb 1987, M. Maher; QM S8994, female, Capalaba, Leslie-Harrison Dam, 27°31'S 153°11'E, 8 Nov 1976, R. Hiatt; QM S9080,1 ♂, Teviot Falls, via Boonah, 28°13'S 152°28'E, rainforest, pitfall, 25 Aug-3 Oct 1976, G & S. Monteith. Brookfield, Gold Ck Reservoir, 27°29'S 152°55'E, rainforest: QM S8971, 1 ♀, 25 Aug 1979, R.J. Raven; QM S20625, 2 juveniles, night collection, 22 Jan 1981, V. Davies, R. Raven; QM S20626, 1 ♀, 30 Oct 1980, V. Davies, R. Raven. Pine Mt, Ipswich, 27°30'S 152°44'E, rainforest, pitfall: QM S9068, 1 ♂, 20 May-11 Aug 1976, G & S. Monteith; QM S9072, ♂, 27 Feb-20 May 1976, G & S. Monteith; QM S57951, 1 ♂, Pine Mountain Environmental Park, 27°32'S 152°42'E, open forest, pitfall, 11 Nov 1998-13 Jan 1999, G Monteith, D. Cook, G Thompson. QM S9793, 1 ♀, Toowong, 27°28'S 153°00'E, 7 Jan 1989, A. Fay; Rochedale State Forest, 27°37'S 153°08'E, open forest: QM S8968, ♀ litter, 20 Sep 1979, R. Raven, V. Davies; QM S8969, 1 ♀, 21 Aug 1980, R.J. Raven; QM S8977, ♀, 20 Sep 1979, R. Raven, V. Davies; QM S20628, ♂, pitfall, 7 Jul 1979, R. Raven, V. Davies; QM S9104, ♀, 5 Apr 1973, R.J. Raven; QM S20614, 1 ♀, 1 juvenile, 20 Dec 1979, V. Davies, R. Raven; QM S20615, 1 ♀ 12 Jun 1980, V. Davies, R. Raven; QM S20619, 2 juveniles, in burrows, 20 Jul 1979, R. Raven, V. Davies; QM S20620, 31 Jan 1980, R.J. Raven; QM S20624, 3 ♀♀, 1 Jul 1980, R. Raven. Camerons Scrub, 27°29-30'S 152°43-44'E, vine scrub, pitfall: QM S49703, 49707, 3 ♂♂, 11 Nov 1998-13 Jan 1999, G. Monteith, G. Thompson, D. Cook; QM S54308-10, S54312, 4 ♂♂, 13

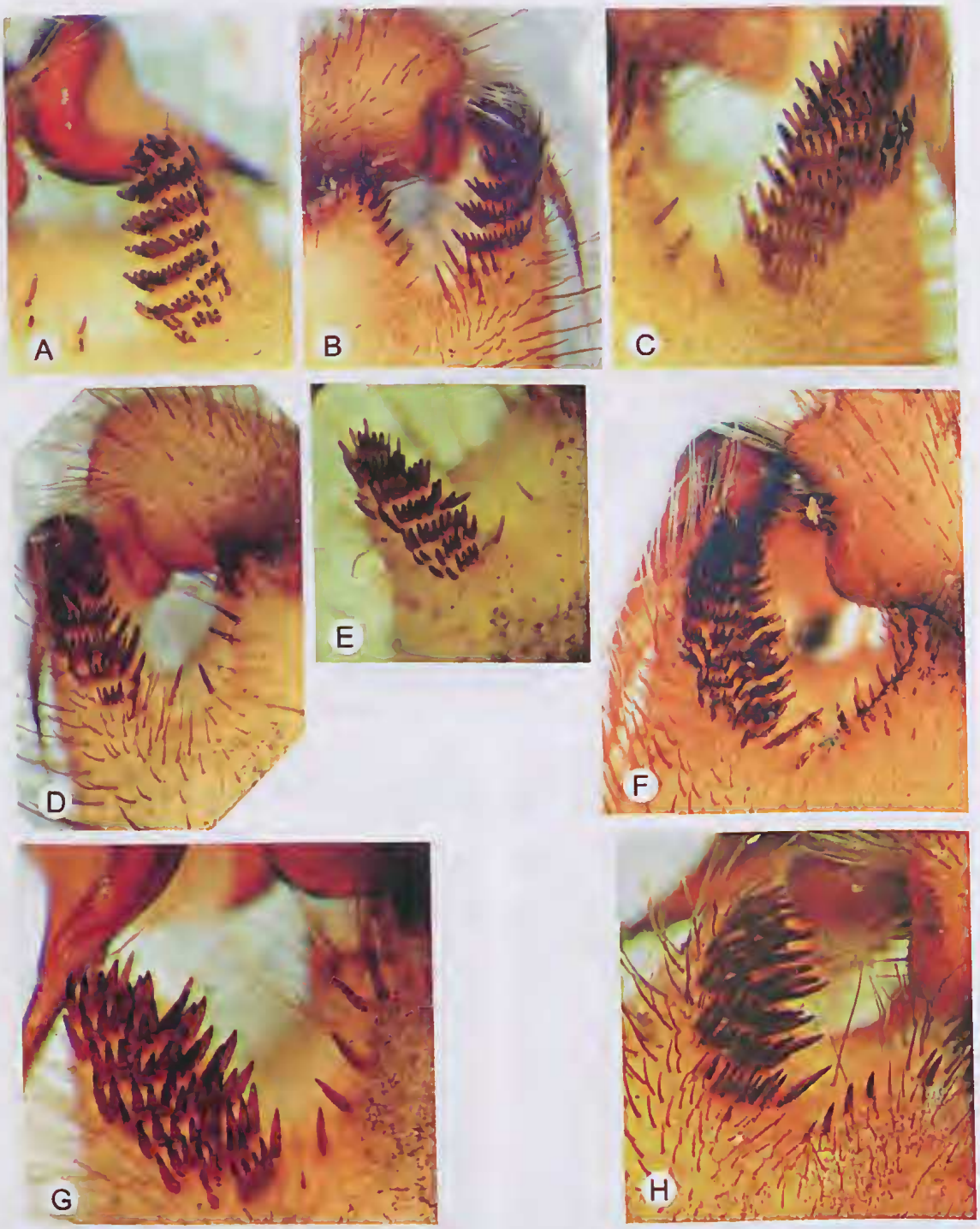

FIG. 4. *Arbanitis longipes* (L. Koch, 1873), retrolateral view of RTA of males showing variation in spines per row and number of rows: A, Rosens Lookout, Beechmont, QM S9124; B. Bahrs Scrub, QM S8909; C, Flinton Hill, qm S9072; D, Beerwah, QM; E, Teviot Falls, QM S9080; F, Mt Tamborine, QM S54307; G, Rochedale State Forest QM S20628; H, Camira, QM S25921

Jan-6 May 1999, G. Monteith. Mt Tamborine, 27°55'S 153°11'E, rainforest: QM S54307, ♀, pitfall, Nov 1978-14 Jan 1979; QM S54324, 1 ♀, V. Salanitri; QM S9012, 2 ♀♀, 23 Oct 1912, Hacker; QM S8980, 4 ♂♂, Dalby Property, Summer 1980/81, P. Ogilvie; QM S8970, ♂, 19 Oct 1980, J. Mariott; QM S9135, ♀, Palm Grove, pitfall, 25 May-13 Oct 1975, G. & S. Monteith. Rozens Lookout, Beechmont, 28°07'S 153°11'E, rainforest, pitfall, G. & S. Monteith: QM S9123, ♂, 25 May-30 Aug 1975; QM S9124, male, 26 Oct-14 Dec 1974. SAM NN2869-70 (1992654-5), ♀ & juvenile, Kedron Brook, Brisbane, [27°25'S, 153°02'E], 1912, R.H. Pulleine, labelled as "*Arbanitis pulchra*, R.". All in SE.Q.

DIAGNOSIS. Males differ from those of *A. robertcollinsi* sp. nov. and *A. beaury*, sp. nov. in having RTA spines in 4-9 ordered ranks, and further from *A. beaury*, sp. nov. in having only bristles on the cymbium. Females have basifemoral thorns only on IV. Males and females with dark bar on prolateral and retrolateral face of femora, patellae, and tibiae I-IV.

DESCRIPTION. HOLOTYPE ♂. Carapace 6.06 long, 4.18 wide. Abdomen 6.68 long, 3.43 wide. Total length, 15.

Colour in alcohol. Carapace orange brown with darker striae, eyes with black edges but entire region not dark; chelicerae red brown. Abdomen presumably faded, fawn coloured. Legs yellow brown, prolaterally and retrolaterally patellae, tibiae and to lesser extent metatarsi I, II with darker faces.

Carapace. Bands of long silver hair on interstrial ridges and caput. Margins with band of 2-3 irregular lines of short black thick curved bristles forming roughly triangular area posteriorly. Few dark (weak) bristles on interstrial ridges. Fovea wide, straight with recurved edges. Large recurved bristle between AME, smaller curved one between PME. One long and two short weak anteromedial bristles.

Eyes. Eight in two rows, front row strongly procurved and clearly wider than slightly recurved back row. Set on low mound extending forward to include clypeus. Group front width: back width: length, 42: 36: 25; anterior ocular quadrangle front width: back width: length, 42: 21: 18. AME: ALE: PME: PLE, 10: 14: 6: 7. Interspaces as AME diameter: AME-AME, 0.4; AME-ALE, 0.5.

Chelicerae. Long, slender with hirsute triangular band entally. Bristles become thicker and shorter towards fang. Rastellum strong: irregular line of 7 short thick spines from inner edge about half of fang edge with 2-3 spines behind that. Intercheliceral tumescence a moderately large pallid area. Fangs long without outer keels or ridges, no serrations on ventral keel. Furrow promargin with 6 small spaced teeth, retrobasally a line of 5 smaller teeth.

Maxillae. Long, with rounded heel with *ca*. 9 lanceolate cuspules on anterior inner edge. Anterior lobe distinct but without defining groove.

Labium. *ca*. twice as wide as long, without cuspules or spinules; anteriorly indented with median transverse mound; bristle clusters on lateral lobes anteriorly. Labiosternal groove a continuous wide groove, ending just before sternum edge.

Sternum. Narrow, widest at coxa II. Bristles slightly thicker on submargins than centrally; uniform cover of long bristles, fine hairs and short setae. Sigilla: anterior and middle small, within 0.5 diameter of margin, posterior similar size but 1 diameter remote from edge.

Legs. Coxae without strong setal clusters; inner edges rounded. Generally covered with strong bristles and spines. Tibia 1 without modified enlarged spines or spurs. Metatarsi and tarsi I, and tarsi II gently dorsoventrally bowed, metatarsi 1 laterally flattened distally. All legs long, slender.

Scopula. Scopulate areas of I, II pallid, without setae or spines. Long hairs, moderately dense, and extending to lateral edges for distal half of metatarsi I, II; scattered hairs only on III. Dense, full, entire but short on tarsi I, II, sparse and intermixed with spines and bristles on III, no scopuliform hairs on IV.

Trichobothria. Cymbium medially with 2 lines of 4-5 filiform trichobothria separated by setae. Metatarsi with long line becoming irregular distally. Tarsi with irregular narrow band (=narrow zigzag) for length.

Spines. Spines in line along edges or in cluster are represented as p4, if paired they are shown as 2.1.1. I: fe p2d5; pa p2v2; ti p3v5.1.4.3; me p1v1.1.2; ta 0. II: fe p2d4; pa p3; ti p2v3.1.3.1.3; me p2v1.2.1.1; ta rv1. III: fe p1d3r2; pa p3; ti p3r2.1.1.1v2.2.1.3; me p4r2v2.1.2.2.1.3; ta p2pv5rv4. IV: fe d4r2; pa 0; ti r5 (long) v4.1.2.3; me p1r4v.1.2.1.2.1.1.3; ta pv6rv6. Palp: fe 0; pa p1; ti only on process; ta 0.

Claws. I: STC with long sinuous row from distally ental to basally mesal; all teeth of similar size but basal penultimate tooth longer; ITC slightly curved, bare. IV: short curved row of 5 similar teeth entally, clearly separated from basal pair of two larger teeth.

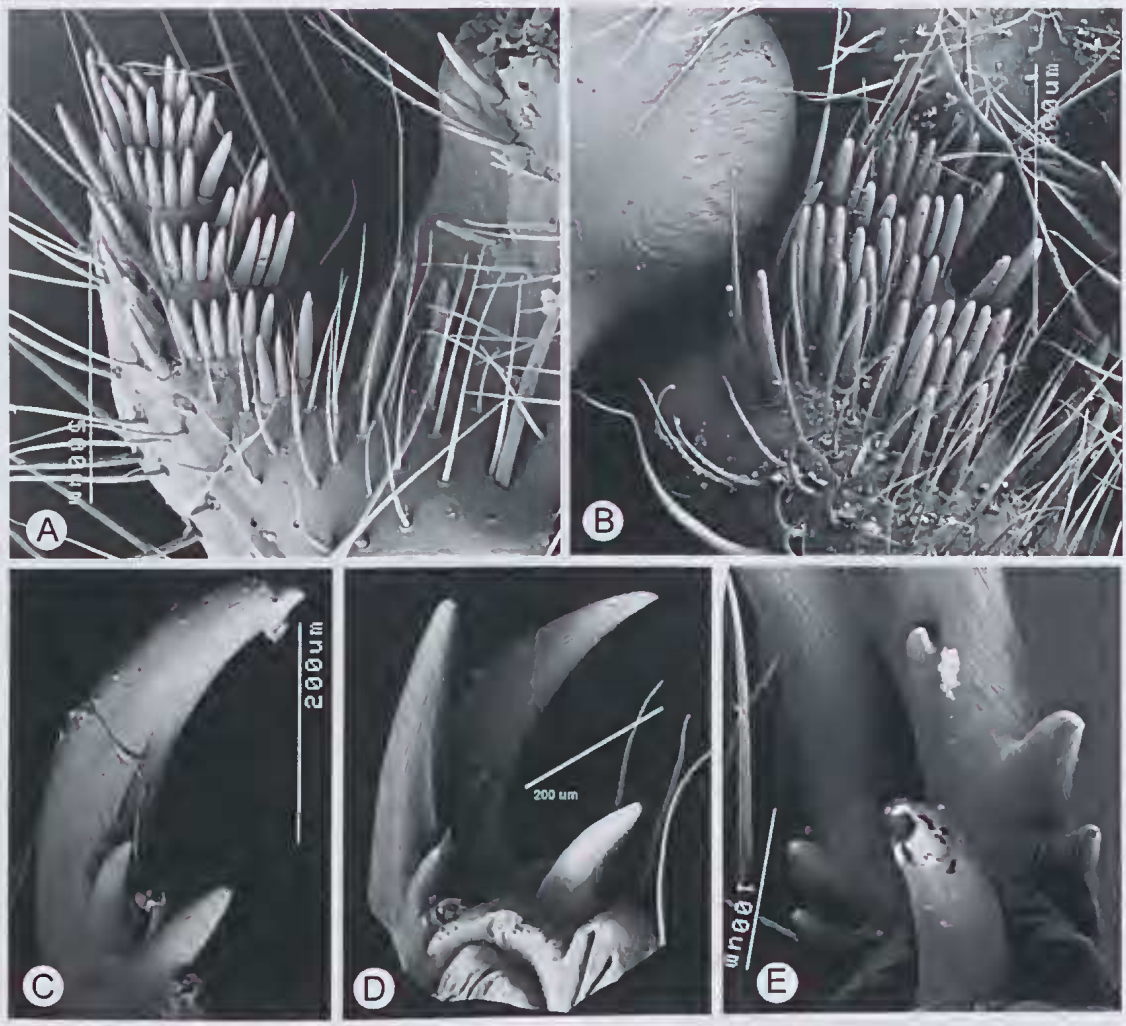

FIG. 5. *Arbanitis longipes* (L. Koch, 1873), scanning electron micrographs, A, C-E. A, RTA, Beerwah, retrolateral view; C, female palpal claw; claws on female leg I (D), and IV (E). B, *Arbanitis robertcollinsi*, sp. nov., RTA, retrolateral view.

Palp. Tibia slightly flattened laterally with strong distally directed retrolateral process in apical third; process extends beyond line off end of tibia; ventral half of tibia and inner edge of process pallid, unsclerotised; inner base of process abruptly joins tibia ventrally; setation on retrolateral tibia shorter than prolaterally. Process broad, conical with distinct transverse lines or rosettes of long spines retrolaterally, lineation disrupted apically by lines of 3, 7 and 3 apically; distal of process 6 long spines in short sloping area to end of tibia. Cymbium with short lobe forming angle of *ca*. 90° separated widely from short rounded prolateral lobe. Bulb: large basal subtegular lobe joined to tegulum by wide less sclerotised zone leading to continuous basal haematodocha; embolus tapers gradually to simple twisted tip.

Spinnerets. PMS large, distally lobular; PLS basal= middle> domed apical.

Posterior Book-lungs. Covers 1.37 wide, 1.12 long; aperture 0.67 wide, 0.10 deep, with fringe of long teeth across aperture.

♀ QM S8994. Carapace 7.63 long, 5.56 wide. Abdomen 8.88 long, 5.75 wide.

Colour. Carapace, chelicerae reddish-orange brown, carapace with narrow dark edge. Abdomen dorsally with dark solid broad brown

medial band breaking up in posterior third; 4 pairs of oval to tear-shaped fawn or unpigmented areas on ectal edge of medial band, anteriorly smallest area (by half) at 1/5, wide gap posteriorly to next and largest ovoid area, next two pairs larger, more tear-shaped and equidistant apart; narrow irregular band runs for length; after fourth pair of fawn ovoid patches brown weakens quickly to mottling almost to unpigmented just anterior to spines; two more pairs of ovoid fawn spots evident in posteriad; laterally, abdomen lightly mottled brown, ventrally entirely fawn, without brown mottling. Legs orange brown with dark "burnt" brown areas on pro- and retrolateral femora, patellae, tibiae of palp to leg II and metatarsi I, II; weaker such marks on femora III, IV, tibiae and metatarsi III, IV; reduced to distal collar and triangular shadow on patellae III, IV. Femora I, II also with longitudinal ovoid zone retrolaterally on I, II. Burnt zones extend for length of patellae, palpal tibiae, tibiae I, II and prolateral palpal patella but only distal half of retrolateral palpal patellae. Sternum, maxillae and labium red brown. Coxae I, II ventrally slightly brown in anterior half.

Carapace. Narrow, widest just anterior to fovea narrowing in gentle curve anteriorly and posteriorly. Striae deep, glabrous: anteriorly with wide deepening at mid-length, next is lenticular not reaching edge, next is short, oval just posterior to fovea, posterior pair long not reaching edge. Fovea broad, deep, straight to very slightly procurved, without enlarged setae. Pile of long white hair on interstrial ridges, thinner on margin. Lateral margins with short fine brown bristles. 3-4 weak bristles posterior of fovea and 2 thick on prefovea ridge in anterior half. *ca.* 10 brown bristles between PME, one long broken anterior to AME in AOQ; 2 large and 6 small on clypeus edge in front of eye group. ALE set 0.5 diameters from carapace edge.

Eyes. Occupy 0.28 of headwidth; 8 in three rows or anterior row curving so strongly procurved that posterior margin of ALE is anterior to margin of AME. Group front width: back width: length, 64: 54: 42; ocular quadrangle of AME and ALE, front width: back width: length, 40: 20: 15; MOQ front width: back width: length, 33: 35: 26. AME: ALE: PME: PLE, 17: 16: 9: 11. Interspaces as AME diameters: AME-AME, 0.59; ALE-ALE, 2.0; PME-PME, 1.41; PME-PLE, 0.24. AME and PME only on low tubercle. Back row recurved.

Chelicerae. Robust, but from above curving gently to tip. Ental band of few long bristles and sparse golden or silver hairs, band narrow and widest posteriorly. Rastellum with distal line of 6-8 strong curved spines not on mound to about midpoint of fang joint, above that, roughly triangular area of longer and slightly thinner spines. Promargin with 7 large teeth similarly but not equally spaced, basal half of furrow with 6 small and 2 even smaller teeth along retrobasal edge.

Labium. 0.84 wider, 1.28 long, roughly triangular, no cuspules, anteriorly indented, cluster of long curved bristles on anterior lateral corners.

Maxillae. Front width: back width: length, 1.94, 2.81, 1.31; anterior lobe indistinct, inner edge concave with *ca.* 20 blunt cuspules clustered in anterior inner corner; heel projects posteriorly over labium and sternum; uniform cover of long curved bristles.

Sternum. 4.44 long, 3.13 wide. Posterior sigilla oval 0.44 long, 0.31 from margin. Ovoid, extends short distance between coxae IV. 3 pairs of sigilla; short fine brown hairs between sigilla and margin; long brown bristles centrally on sternum. Posterior sigilla ovoid, one length from margin.

Legs. Coxae I, II with slight heel. Legs I, II more slender and lighter built than III, IV. Tibiae and metatarsi IV with flat asetose but hirsute retrolateral face. At least 1 long erect seta on dorsal band on tibiae-tarsi I, II. Retrobasally on femur IV short group of (basifemoral) thorns in 2-3 bands; absent on I-III.

Leg measurements (femur to tarsus, total). Leg 1: 5.00, 3.38, 3.31, 2.94, 1.69; 16.32. Leg 2: 4.38, 3.06, 2.88, 2.50, 1.50; 14.32. Leg 3: 3.56, 2.44, 1.94, 2.44, 1.56; 11.94. Leg 4: 4.88, 3.50, 4.75, 3.94, 1.88; 18.95. Palp: 3.63, 2.13, 2.38, 2.38; 10.52. Leg ratios: I, 2.14; II, 1.88; III, 1.56; IV, 2.48.

Scopula. Dense on palpal tarsus, longest prolaterally; on tarsi I, II, distal 3/4 metatarsus I, 2/3 metatarsus II, absent on III, IV.

Spines. Absent on tarsi I, 2-3 ventrally on tarsi II. Prodistal knuckle of *ca.* strong bristles on femur IV. I: fe basal d2 bristles; pa p2; ti p1.1v1.1.2; me v 1.2.2. II: fe as I; pa p1.1; ti p1.1.v1.1.1; me p1 basal v2.2.2; ta v2-3. III: fe, 0; pa 8 long thorn setae prolaterally + 2 dorsal bristles; ti p1.1.r1.1.1.v2.2.3; me p1.1.1.2r1.1.1.v2.2.1.5; ta p1v12. IV: fe with knuckle; pa 15-20 short strong bristles opposing femoral knuckle; ti p0r1.1.1.1.v2.2.2w; me p0r1.1.1.v2.2.1.3.1.1.4; ta v15. Palp: fe and pa, 0; ti p2v2.2.3; ta v2 basal.

Trichobothria. *ca*. 8 per row basally on tibiae in sigmoidal lines converging distally at half length of tibia; *ca*. 14 basally on metatarsi in line but basally on retrolateral face and distal 6 staggered irregularly; tarsus with *ca*. 14 staggered irregularly, intermixed with setae, with no regular pattern of distribution. Tarsal organ subdistal, off centre line.

Claws. Palp with 1 long tooth basally, 3 small teeth to midlength on ental margin. Third claw long, curved, bare. Paired claws: I basally with bifid tooth, at midlength 3-4 smaller close together on ental edge, more on anterior claw; II, likewise with 5 on anterior claw, 3 on posterior claw and single basal tooth; IV with 2 large basal, anterior claw has 2 small teeth slightly distal of those, posterior claw has 2 basal and 3 very small on definite ental face.

Abdomen. Book-lung comb present, apertures narrow, slit-like.

Spinerets. PMS almost as wide as long but large; 0.53 long, 0.47 wide. PLS: basal 1.25 long, 0.75 wide at midpoint; middle and apical, articles 0.31, 0.19, long respectively.

VARIABILITY. The spines on the RTA form distinct transverse lines or ranks. The number of ranks of spines on the RTA and the number of spines in each rank varies between localities, some even in adjacent localities. In the holotype, there are only 4 straight continuous ranks with broken or discontinuous ranks basal and a distal cluster (Fig. 2C). However, in QMS54307 from Mt Tamborine, the number of ranks is closer to 9 plus 3 wide basal ranks and a distal cluster (Fig. 4F). Nevertheless, in all males included in *A. longipes*, the RTA spines are in ranks, there are few or no spines on tarsi I, II, and there are no true spines but at most strong bristles on the cymbium.

Although some males show strong similarity to the holotype in the palpal spination and are of similar size, only males from west of Brisbane at Camira and Flinton Hill (Ipswich) corresponded completely in size, palpal spination, and scopula on tarsi IV.

Abdominal pattern also shows some variability but usually the abdomen is ventrally pallid; however, males from Bahr's Scrub just south of Brisbane are darker dorsally and have brown flecks lateroventrally and the posterior booklung covers have a brown edging anteriorly.

DISTRIBUTION. SEQld to NE NSW; best knowledge is of localities south of the Brisbane River from Capalaba to Ipswich. Records north of the Brisbane River are limited: Brookfield, Enogerra, Toowong, and the most northerly locality at Beerwah.

HABITAT. Spiders were found in the most marginal and disturbed habitat adjacent to industrial areas, in suburban Brisbane, open forest on clay or sand, semi-evergreen vine thickets, rainforest and roadside verges adjacent to paddocks. They were most numerous on roadside verges adjacent to rainforest. Spiders were generally found in lowland areas but occur at least at Mt Superbus (870m), Mt Tamborine (670m.), and Beechmont (450m.), and they approach the elevation at which the sister species (*A. robertcollinsi*, sp. nov., 950m.) is known. Significantly, the latter two locations are simply the "lower" slopes of the same mountain range that rises to be capped by *A. robertcollinsi*.

This broad diversity of habitat of an idiopid mygalomorph contradicts conventional wisdom (e.g., Main, 1981) about idiopids which have to date been considered highly restricted in their habitat preferences. Equally, the differences in burrow entrance (below), especially with respect to use of leaves in the collar, have not before been reported in Australian idiopids.

PHENOLOGY. On attaining maturity (see Conservation, below), males wander in search of females with which to mate. Almost all records of male activity are derived from pitfall trap data where any one collection date spans from 1 to 8 months. To use these data, one unit was assigned to each male found in each month of the potential collection period; hence, one male taken in pitfall traps set from April to January contributes 8 units. A total of units shows the likelihood of male activity: lowest was from June 1 to October 1 (4 months, 16 units); from October to May, the three contiguous month likelihood ranged from 21-44 units, mode 32; from October to March, the mode was 40. Hence, males are active yearlong (two males were taken in July and August) but highest activity occurs in summer from November to April. In contrast, over 50% of males of the sister species, *A. robertcollinsi*, sp. nov., were taken between April and June.

CONSERVATION. Mygalomorphs are univoltine, long-lived and highly sedentary animals. What little we know of their biology is deduced from studies of few species, some unpublished. An egg sac is made in the burrow. The young emerge, remain in the maternal burrow for one or two moults and then disperse

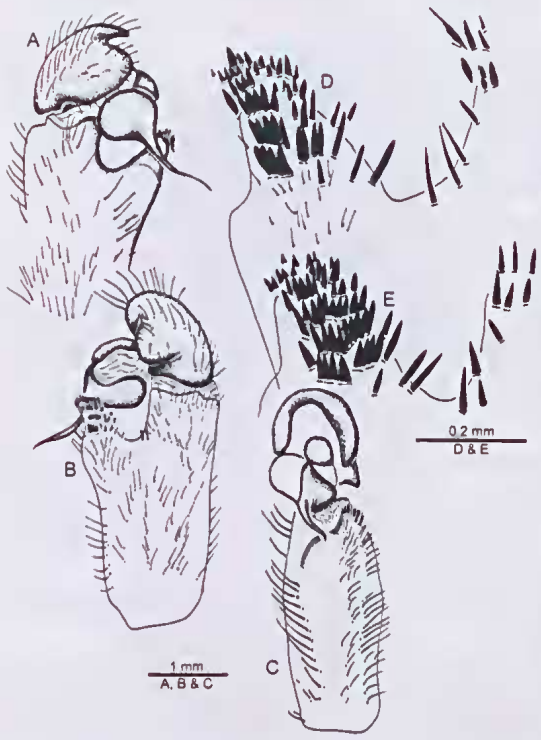

FIG. 6. *Arbanitis robertcollinsi*, sp. nov., palpal tibia, RTA, tarsus and bulb, male. A-C, prolateral (A), retrolateral (B), and ventral (C) views; D, E, RTA, retrolateral view at different angles.

very nearby and make their burrow. Spiders mature after 5-7 years during which time all make similar burrows. The female remains in the burrow, enlarges it and moults each year. The male, once adult, leaves the burrow and wanders in search of the female, mates and is either eaten by the female or dies soon after. Females of larger species (e.g., Theraphosidae, large Hexathelidae) live for over 20 years. Judged on size alone, females of *A. longipes* probably live at most 10 years, possibly longer in rainforest from where larger females are known.

The proximity of *A. longipes* to large and growing urban areas of Brisbane and Ipswich raises concerns about its viability. It is important here to distinguish between presence of live adults and a viable population. Remarkably, Toowong is deep in the heart of suburban Brisbane and a female was collected in 1989.

BURROW. Females build a short (8-20cm long) sinuous burrow without a door or tube-like extension; in some burrows, the burrow is Y-shaped (as in the nemesiid *Aname*; Raven, 1981). The second "entrance" in the burrow of one female (QM S 8977) measured was 7-8cm from the main entrance and just below the soil, i.e., a thin layer of soil obscured the opening. The two tubes joined at 12-15 cm depth and a short shaft continued below that for *ca.* 5 cm. The burrow entrance is only slightly raised above the ground and inclined at about 30° to the horizontal (Figs 1C, D). In many burrows seen (by RR), especially smaller spiders, the entrance lacked leaves. Leaves were bound into burrow entrances (Fig. 1D) of larger females found on the top of embankments at Pine Mt. Burrows were found on flat or almost flat ground as well as on slopes and roadside cuttings. On embankments up to 1 metre high, burrows were more numerous (*ca.* 5 in 30x30cm square) on the upper than lower half and were most numerous (up to 20 in 30x30cm square) at the top of the embankment and close behind it on the flatter slope.

Burrows were found in areas of exposed earth most commonly with little leaf cover and in slopes of any aspect to the sun . No burrows were found where the leaf litter was dense (i.e., leaf fall was high). On gentle slopes, burrows showed strong clumping—burrows of juveniles were clustered within 30cm of a larger burrow, presumably that of the maternal female.

The burrow silk contrasted to that seen in other *Arbanitis* species. Silk at the burrow entrance of larger females was thick but silk *ca.* 1-3 cm (i.e., more with larger spiders) below that was very thin, fine and white but not concealing the spider, not adhering to the edge of the tube, and easily broken or torn—much like that in the diplurid *Australothele*.

Unlike the Tube-spiders (e.g., *Misgolas robertsi*, *M. mascordi*), which build an extended aerial tube (not unlike that built by the Palaearctic *Atypus* but with an opening), females of *A. longipes* do not raise the burrow off the ground to any extent. The most elevated seen were those on the crest of embankments in which extension is exaggerated by the slope.

SYMPATRIC MYGALOMORPHS. The Queensland Museum database was checked for other mygalomorphs which were taken in areas contiguous with, adjacent to, or including those in which material of *A. longipes* was taken, i.e., they could be taken to be sympatric. (*A. longipes* was also recorded from greater Brisbane.) Eleven such localities were identifiable; all localities had

been surveyed for at least 1 year, if not longer, or the mygalomorphs were well known. Of those, diversity varied from 3 species in 3 families (Bahrs Scrub) to 16 species in 7 families at Mt Tamborine.

REMARKS. Although the published type locality of *Arbanitis longipes* is "Bowen", Queensland, the only material closely matching the holotype are from areas around Brisbane. The possibility that an as yet undiscovered population of *A. longipes* may be found near Bowen cannot be dismissed completely. However, we examined all collections of Australian museums for idiopids with no spur and spines in lines on the palpal tibial apophysis of males—the minimum qualifying characters for *A. longipes*. That search yielded only the material listed here. All male idiopids from the Bowen region in the QM collection have a tibial spur and the spines on the tibial apophysis do not closely resemble the lines in *A. longipes*. Equally, no other spider species yet known has a distribution that includes only the Brisbane area and Bowen. As indicated above, a very close match of new material from Camira with the holotype makes the issue conclusive. Hence, we consider that the type-locality is incorrect, not unknown in the Godeffroy material (e.g., Raven, 1982), and was presumably "Brisbane" but most precisely is Camira on the Brisbane-Ipswich civic boundary.

Arbanitis robertcollinsi, sp. nov.
(Figs 5E, 6, 7, 12, 13)

MATERIAL. HOLOTYPE: QMS28822, ♂, Springbrook Repeater Station, 28°14'S 153°16'E, SE.QLD, rainforest, intercept flight trap, 14 Mar 1997-15 May 1997, G Monteith. PARATYPES. QLD: Lamington National Park, rainforest, SE.Q. Allotype: QMS54321, ♀, Binna Burra Lodge, 28°11'S 153°11'E, SE.QLD, rainforest, 19-20 May 2003, R.J. Raven; QMS54322, ♀, same data as S54321; QMS31798, S42712, 3 ♂♂, Echo Point, 28°15'S 153°10'E, pitfall, 24 Mar-24 May 1992, G Monteith; QMW2390, ♂, 22 May 1963, G Monteith; QM S20684, 2 ♂♂, Eeho Point, pitfall, 27 Dec 1991-24 Mar 1992, G Monteith; QMS8932, 13 ♂♂, O'Reillys, 28°13'S 153°08'E, Apr-Jun 1982, G Monteith; QM S8983, 2 ♂♂, O'Reillys, pitfall, 15 Jan-4 Feb 1982, G Monteith, D. Yeates; QMS9074, ♂, O'Reillys, pitfall, 28 Sep 1975-31 Jan 1976, G & S. Monteith; QM S8966, S9031, 3 ♂♂ [2 ♀♀], O'Reillys, Wishing Tree Circuit, 28°14'S 153°08'E, pitfall, 27 Dec 1981-15 Jan 1982, G Monteith, R. Raven. D. Yeates; QM S54306, ♂, Springbrook Repeater, 28°14'S 153°16'E, intereept flight trap, 9 Jan-19 Feb 1995, G Monteith; QMS48460, ♂, Tullawallal, Binna Burra, 28°12'S 153°11'E, pitfall, 9 Jan-6 Apr 1995, G Monteith. NSW: AM KS 48903: McPherson Range, 28°22'S, 152°45'E, 550m, H. Smith. Hines Pugh Webber, pitfall trap (T2.29), 22 Feb 1989, Mt Warning Caldera Survey, University of New England.

DIAGNOSIS. Males differ from those of *A. longipes* in having a pronounced mound at the base of RTA and the spines on the RTA are not in such clearly spaced ranks, especially near the tip of the RTA.

DESCRIPTION HOLOTYPE ♂. *Colour in alcohol.* Carapace orange brown, eyes with black edges but entire region not dark; chelicerae dark red brown. Abdomen dorsally fawn with irregular brown flecks; ventrally without pattern. Legs orange brown, lateral with slightly darker "burnt" area on patellae I and II only.

Carapace. Broken lines of silver hair on interstrial ridges and caput ridge. Margins with band of 2-3 irregular lines of short black thick curved bristles. Fovea wide, straight with recurved edges; 2-3 pairs weak foveal bristles. Four short weak anteromedial bristles.

Eyes. Front row slightly wider than straight back row.

Chelicerae. Rastellum soil-encrusted, strong: line of 5 short thick spines from inner edge to half fang width; no spines above basal group on inner cheliceral edge. Fangs long without outer keels or ridges, no serrations on ventral keel. Furrow promargin with 8 irregularly spaced teeth, retrobasal line of 4 larger distal and group of 2 basal rows of 6 smaller teeth.

Labium, maxillae. Like *A. longipes*. Labiosternal sigilla narrows medially to form tear-shaped sigilla with low adjacent sternal edge.

Sternum. Sigilla: all oval. With many fine setae uniformly mixed with bristles.

Scopula. Scopulate areas of I, II almost asetose, pallid. Long hairs, moderately dense, and extending to lateral edges for distal half of metatarsi I, II; scattered hairs only on III. Dense, full, entire but short on tarsi I, II, distal and entire III, IV.

Spines. I: fe p1d1 1w; pa p1v1; ti p4v3.2.1.3; me p1v3.1.1; ta 0. II: fe p5d4r1; pa p2; ti p4v7; me p1v1.2.1.1.2; ta 0. III: fe p2d3r2; pa p7r1; ti p4r3v2.2.3; me p5r4v2.1.1.4; ta p2rv1. IV: fe r2; pa 0; ti r5 (long) v3.2.2; me r4v2.1.1.2.1.4; ta p2rv3. Palp: fe 0; pa p2; ti only on process; ta 0.

Claws. I: STC with long sinuous row from distally ental to basally mesal; all teeth of similar size but basal 2 penultimate teeth longer; ITC slightly curved, bare. IV: short curved row of 4 similar teeth entally, clearly separated from basal pair of two larger teeth.

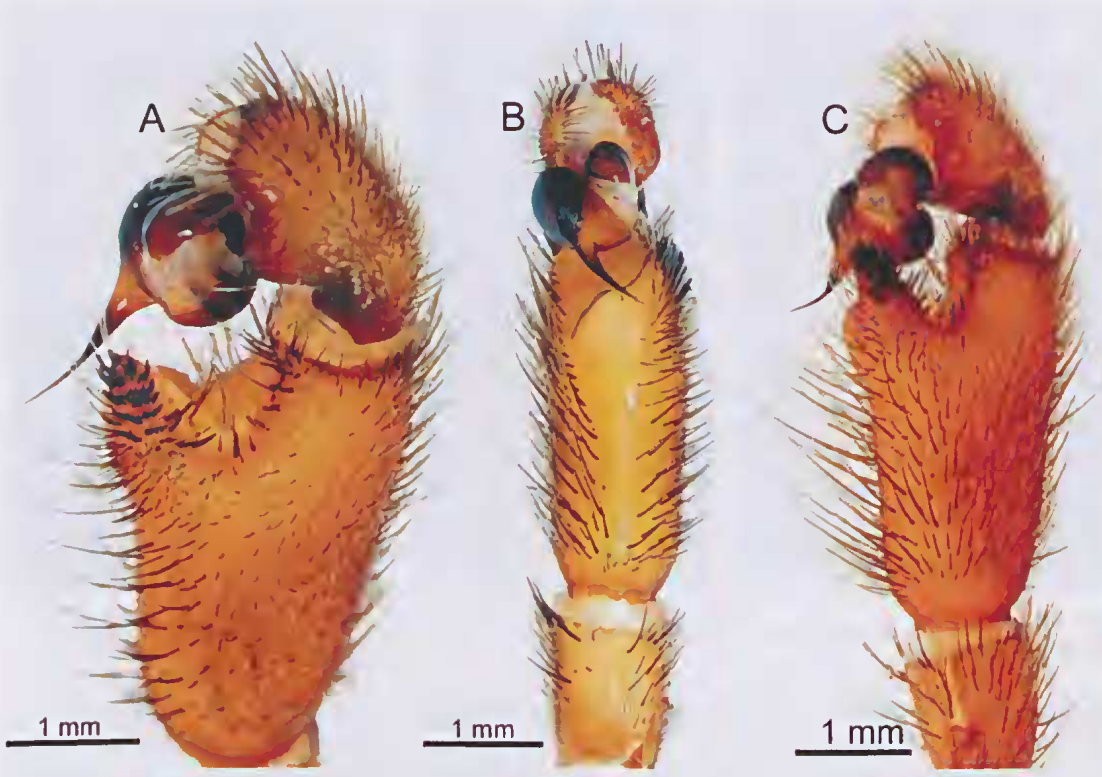

FIG. 7. *Arbanitis robertcollinsi*, sp. nov., palpal tibia, RTA, tarsus and bulb, male. A, C, retrolateral views; B, ventral view.

Palp. Tibia slightly flattened laterally with strong distally directed RTA in apical third; process lies within line off end of tibia; ventral half of tibia and inner edge of process glabrous; inner base of process with distinct ental mound; in distal half with 5 ranks of long blunt spines, in each rank spines in rosettes of 4, basal rank more separated than others, each rank with 8-10 digitiform pairs, 3-4 long spines on basal process, 4 in rough line in short curve and 2 groups each with 3 distally; embolus with simple filiform tip. Cymbium aspinose.

♀. Unable to be reliably matched to male.

REMARKS. One species of *Arbanitis* and three species of *Misgolas* are known from the Lamington National park. We cannot be sure which female matches the male until we have biological data or collect a female live, get its DNA checked against *A. robertcollinsi* and then describe it or compare it to the one described here.

ETYMOLOGY. For Robert Collins, who first pressed for the designation of the McPherson Range area as a national park.

DISTRIBUTION. Known only from Lamington National Park, SE.Q.

Arbanitis beaury, sp. nov.
(Figs 8, 12, 13)

DIAGNOSIS. Differs from *A. longipes* in lacking prolateral spines on femora I, II and spines on tarsi II and patellae I, II and from *A. robertcollinsi* in having spinules on the cymbium, also the spines on the RTA are all long but not in such distinct ranks as in *A. longipes*.

MATERIAL. HOLOTYPE: AM KS48641, M, Beaury State Forest, 28°33'S 152°19'E, 4 Feb-9 Apr 1993, M. Gray, G. Cassis.

OTHER MATERIAL. AM KS 36693, M, Boonoo State Forest, Boonoo Forest Drive, 1.8k from Mt Lindsay Highway, 28°56'S 152°06'E, M. Gray, G. Cassis, 4 Feb-9 Apr 1993. KS36694, Boorook State Forest, M [and pM nontype], midway between Boorook and Gilgurry Cks on

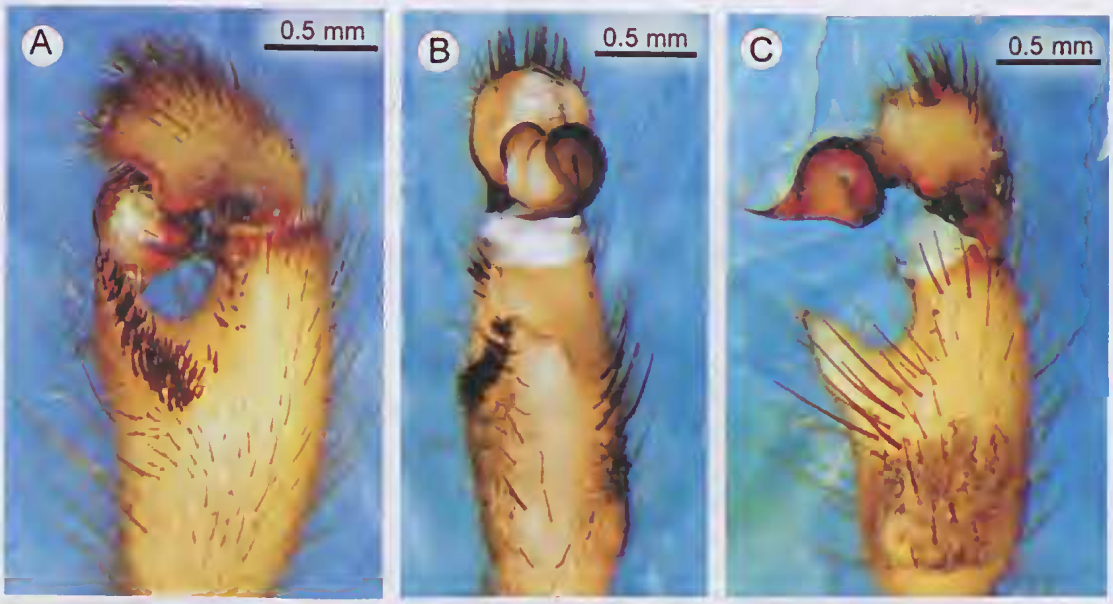

FIG. 8. *Arbanitis beaury*, sp. nov., palpal tibia, RTA, tarsus and bulb, male. A, retrolateral views; B, ventral view; C, prolateral view.

Conlogan Rd, 1km NW Boorook Ck junction, 28°51'S 152°11'E, M. Gray, G. Cassis, 4 Feb-3 Apr 1993.

DESCRIPTION Holotype ♂ AMKS48641. As for *A. longipes* except:

Colour in alcohol. Carapace dark orange brown with darker reticulated areas on caput and interstrial ridges, eyes with black edges; chelicerae dark orange brown. Abdomen dorsally brown with full length pallid widening in distal quarter, 3 paired pallid spots with area of fourth pair broken laterally between, each pair a diagonal pallid stripe; no pattern ventrally. Sternum, maxillae and labium yellow brown, sternum with dark triangular area medially for length. Basal PMS ventrally and laterally and lateral PLS brown. Legs orange brown with burnt brown patches: femur 1 for distal fifth, patella, tibia and metatarsi I pro- and retrolaterally for length, lighter on metatarsi; leg 2 like 1 but not as dark, and only for distal two-thirds retrolaterally on patella; none on legs 3; femur 4 light brown prolaterally for distal sixth, for prolateral length but only distal third retrolaterally on patella, and paler on prolateral tibia; on palp, basal and distal femora, distal third pro- and retrolaterally on patella, pro- and retrolaterally on tibia and basal cymbium with brown collar.

Carapace. Light pile of long silver hair on interstrial ridges and caput. Margins with band of 2-3 irregular lines of short black thick curved bristles. Few weak bristles on posterior pair of interstrial ridges. Fovea wide, with recurved edges. Large recurved bristle between AME, smaller curved one between PME.

Chelicerae. Long, slender with long triangular band of long bristles for length. Rastellum strong: line of 5 short thick spines from inner edge about half of fang edge. Intercheliceral tumescence a moderately large rhomboidal pallid area. Furrow promargin with 6 small spaced teeth, retrobasally a line of 6 smaller teeth ending at mid-length of prolateral row.

Maxillae. Long, with rounded heel with *ca.* 15 lanceolate cuspules on anterior inner edge.

Labium. Labiosternal groove with two separate triangular sigilla.

Legs. Metatarsi and tarsi I, and tarsi II straight.

Scopula. Scopulate areas of I, II pallid. Entire for distal half of metatarsi I, II. Dense, full, entire but short on tarsi I, II, absent on III, IV.

Spines. Line of strong blunt bristles on prodistal edge of femur III. I: fe d5w; pa 0; ti p2v2.2.3; me v2.2; ta 0. II: fe d4; pa 0; ti p2v2.2.3; me v1.1.1.2; ta 0. III: fe d3w; pa p1.2.1.2.2 all long thorns; ti p2d2r2v1.2.3; me p2r3v2.2.1.4; ta pv2v1rv2. IV: fe d4r4; pa 0; ti r5 in line v2.2.2; me p1r3v.2.2.1.5; ta pv5rv3. Palp: fe d4w; pa 0; ti only on process; ta with long spinules.

Palp. Tibia as for *A. longipes* but ventral half of tibia and inner edge of process paler, weakly sclerotised. RTA broad, basally swollen with distinct pallid setose mound, conical with 2 staggered bands of long spines retrolaterally and confined to ventral edge; spines *ca*. 5-7 times longer than wide. Spines in lines from RTA tip to base: 3,6,8,5+6,4+6, basally with 5 then 3 in irregular curving line; in prolateral edge of tibia 2 basal at RTA base then 1.1.1.1.2.1 in distal ridge. Cymbium with *ca*. 8-10 thick bristles or spinules anteriorly. Embolus wide.

ETYMOLOGY. From the type locality.

DISTRIBUTION & HABITAT. Known only from Beaury, Boonoo Boonoo and Boorook State Forests, northern New South Wales.

Misgolas Karsch, 1878

Misgolas Karsch, 1878: 821. Type species by monotypy, *Misgolas rapax* Karsch, 1878.

Hermeas Karsch, 1878: 823. Type species by monotypy, *Hermeas crispus* Karsch, 1878. First synonymised with *Misgolas* by Main, 1985. Note: unknown to Raven (1985) who also noted the synonymy (but used *Hermeas* instead). Main chose *Misgolas* as the senior name and assumed, contrary to the International Code of Zoological Nomenclature, that page precedence was the sole determinant of priority. In so doing, Main selected a type species that was difficult to diagnose from the other four sympatric congeners. Main's designation preceeded that of Raven.

Dyarcyops Hogg, 1902: 130. Type species by original designation, *Dyarcyops andrewsi* Hogg, 1902. First synonymised by Main, 1985.

Megalosara Rainbow, 1914: 205. Type species by monotypy: *Megalosara villosa* Rainbow, 1914. First synonymised by Main, 1985.

DIAGNOSIS. Differs from *Arbanitis* in the pointed conical lobe on the retrolateral cymbium of males, the adorned (with flanges, or serrate keels) embolus and the presence of a distal process retrolaterally on the palpal tibia of males.

SPECIES INCLUDED.

Dyarcyops andrewsi Hogg, 1902
Dyarcyops birvi Kulczynski, 1908
Hermeas crispus Karsch, 1878
Misgolas dereki Wishart, 1992
Arbanitis elegans Rainbow & Pulleine, 1918
Arbanitis gracilis Rainbow & Pulleine, 1918
Arbanitis hirsutus Rainbow & Pulleine, 1918
Cantuaria hoggi Simon, 1908
Misgolas hubbardi Wishart, 1992
Misgolas kirstiae Wishart, 1992
Dyarcyops maculosus Rainbow & Pulleine, 1918
Misgolas mascordi Wishart, 1992
Arbanitis mestoni Hickman, 1928
Idioctis ornata Rainbow, 1914
Arbanitis papillosus Rainbow & Pulleine, 1918
Misgolas rapax Karsch, 1878
Dyarcyops robertsi Main & Mascord, 1974
Arbanitis villosus Rainbow, 1920

SPECIES RESTORED TO *CANTUARIA* FROM *MISGOLAS*

Cantuaria abditus Forster, 1968
Cantuaria allani Forster, 1968
Cantuaria apertus Forster, 1968
Cantuaria apicus Forster, 1968
Cantuaria assinilis Forster, 1968
Cantuaria borealis Forster, 1968
Cantuaria catlinensis Forster, 1968
Cantuaria cognatus Forster, 1968
Arbanitis collensis Todd, 1945
Cantuaria delli Forster, 1968
Maoriana dendyi Hogg, 1901
Cantuaria depressus Forster, 1968
Cantuaria dunedinensis Forster, 1968
Nemesia gilliesi O. P.-Cambridge, 1878
Cantuaria grandis Forster, 1968
Arbanitis huttoni O. P.-Cambridge, 1879
Cantuaria insulanus Forster, 1968
Cantuaria isolatus Forster, 1968
Cantuaria johnsi Forster, 1968
Cantuaria kakahuensis Forster, 1968
Cantuaria lomasi Forster, 1968
Cantuaria magnus Forster, 1968
Arbanitis marplesi Todd, 1945
Cantuaria maximus Forster, 1968
Cantuaria medialis Forster, 1968
Cantuaria minor Forster, 1968
Cantuaria myersi Forster, 1968
Cantuaria napua Forster, 1968
Cantuaria orepukiensis Forster, 1968
Cantuaria parrotti Forster, 1968
Cantuaria pilama Forster, 1968
Cantuaria prina Forster, 1968
Cantuaria reductus Forster, 1968
Cantuaria secundus Forster, 1968
Cantuaria sinclairi Forster, 1968
Cantuaria stephenensis Forster, 1968
Arbanitis stewarti Todd, 1945
Cantuaria sylvaticus Forster, 1968
Cantuaria toddae Forster, 1968
Cantuaria vellosus Forster, 1968
Korua wanganuiensis Todd, 1945

DISTRIBUTION. Australia.

REMARKS. All New Zealand species are restored to *Cantuaria*.

Misgolas bithongabel sp. nov.
(Figs 9, 12, 13)

MATERIAL EXAMINED. HOLOTYPE: QM S9090, ♂, Mt Bithongabel, 28°15'S 153°10'E, 27 Sep 1975-31 Jan 1976, G. & S. Monteith. Paratype: QM S35397, ♂, O'Reillys, 28°13'S 153°08'E, 15 Jan-4 Feb 1982, G.

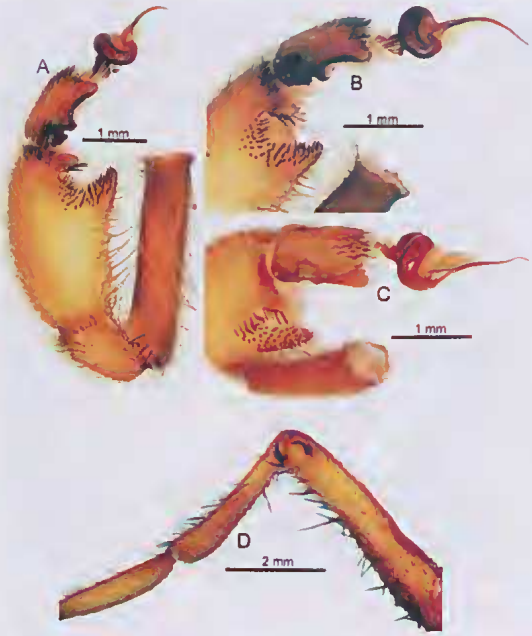

FIG. 9. *Misgolas bithongabel*, sp. nov., leg I, palpal tibia, RTA, tarsus and bulb, male. A-C, retrolateral views; D, tibia, metatarsus and tarsus I, prolateral view.

Monteith, D. Yeates. Both taken in pitfall in rainforest, in Lamington National Park, SE.Qld.

DIAGNOSIS. Differs from the sympatric *Arbanitis longipes* by a pair of megaspines forming the coupling spur on tibia I of males and disordered spines on the palpal tibial apophysis. No other males of described *Misgolas* or *Arbanitis* species have a tibial spur in this simple form.

DESCRIPTION. Holotype ♂, QM S9090; like *A. longipes* except as follows.

Carapace 5.50 long, 4.56 wide. Abdomen 5.62 long, 3.62 wide. Total length, 9.

Colour in alcohol. Carapace and legs orange brown; legs without darker zones. Abdomen dorsally brown with five pairs of oval (anterior pairs) to slit-like (posterior pair) pallid areas; laterally mottled brown fading to almost entirely pallid ventrally save for irregular brown bar at posterior third.

Carapace. With uniform light cover of long fine white hairs ; 10-15 anteromedial bristles, 6-8 pairs of bristles posteriorly directed on posterior caput edge; strong bristles only on margins and between posterior striae.

Eyes. Group front width: back width: length, 44:40:22; anterior ocular quadrangle front width: back width: length, 44: 22: 10. AME: ALE: PME: PLE, 9: 10: 4: 8. Interspaces as AME diameter: AME-AME, 0.6; AME-ALE, 0.4.

Chelicerae. Short, almost geniculate with wide hirsute band of bristles entally and narrow ectal band. Distinct rastellum extends from mid-front entally in slightly diagonal line of 5 long thick spines and 1-3 smaller spines entally. Intercheliceral tumescence a moderately large pallid area. Teeth on furrow promargin; hardened formalin fixation prevents seeing more detail without destroying chelicera.

Maxillae. With *ca*. 20 lanceolate cuspules.

Legs. Tibia I prolaterally with coupling spur of two spine groups: upper with long curved dorsal spine strongly truncated (one side also has scar if second lower spine) on very low mound; low conical mound ventrally with large single apical tapering spine and smaller on edge of spur. Metatarsi and tarsi I, and tarsi II gently dorsoventrally bowed; metatarsi I broadened ventrally.

Scopula. As for *A. longipes* but, dense, full, entire but hairs short on tarsi I-IV.

Spines. All pedal tarsi aspinose. I: fe d4w; pa0; ti v1.1.2 + megaspines; me rv1 basal weak. II: fe d2w; pa 0; ti v1.1.2; me v1. III: fe d2w; pa p2.2.4 thorns; ti p2r2v1.1.1; me p2r2v0. IV: fe d3wr4w + 8 in line in distal comb (spines only *ca*. 3 times longer than wide) opposed by 6 similar on probasal patella; ti p0r0v1.1.2; me r1rv1.1.1. Palp: fe 0; pa 0; ti only on RTA; cymbium, see Palp.

Claws. 4-5 long teeth on cntal face of I, IV, 2 larger teeth on basal midline.

Palp. Tibia slightly flattened laterally with strong distally directed RTA in apical third; RTA about as long as wide at base; inner base of RTA gradually joins tibia ventrally; distinct unsclerotised asetose conical mound at base of RTA pointed ventrally. Process broad, triangular with *ca*. 39 spines on RTA and adjacent ridge. On RTA, spine shape varies from *ca*. 1.5-3 times longer than basal width; spines only on retrolateral and distal faces; one irregular line of basally, more distad a roughly circular area of *ca*. 23 spines uniformly placed but in no evident order, 4 in line distal of that and apically on process, a cluster of 5-6. Secondary apophysis low but with distinct lobe and 6-8 longer spines point basally toward RTA and 3 smaller spines distal of that; valley between two apophyses

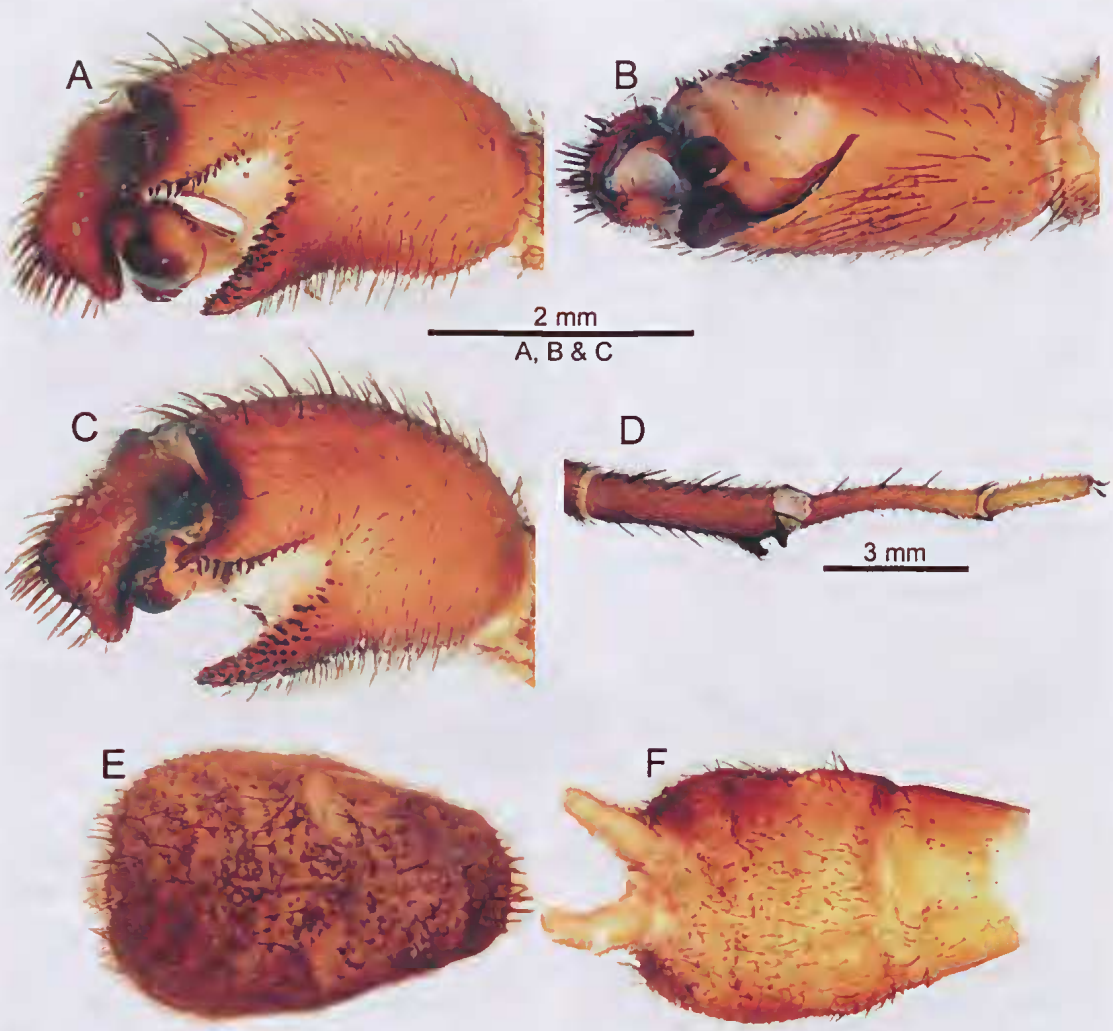

FIG. 10. *Misgolas echo*, sp. nov., palpal tibia, RTA, tarsus and bulb, male. A-C, retrolateral views; D, tibia, metatarsus and tarsus I, prolateral view; E, abdomen, dorsal view; F, abdomen, ventral view.

short (less than basal width of RTA) with 3 longer spines opposed by long spines on secondary apophysis; otherwise short trianguloid thorn-like spines uniformly spread over almost flat triangular area. Cymbium with cluster of broad flat spines in distomedial triangle; acute retrolateral lobe forms angle of *ca.* 60°. Bulb pyriform with large slender median haematodocha extending to narrow base of embolus. Embolus with 8 small serrations, 2 of which terminate low keels off bulb.

Posterior Book-lungs. Covers 1.17 wide, 0.92 long; aperture 0.42 wide, 0.08 deep.

ETYMOLOGY. From the type locality.

BURROW. Conclusive recognition of the burrow of *M. bithongabel* has not been possible. However, throughout the region, a second distinctive burrow type that a likely candidate for the female is recognisable; it is the elevated tube usually attached to small saplings. The tubes are now seen more rarely than in 1970-1980 when Raven's attempt to trap the spider without major excavation was unsuccessful.

DISTRIBUTION & HABITAT. Rainforest at Lamington National Park, SE.Q.

Misgolas echo, sp. nov.
(Figs 10)

MATERIAL EXAMINED. HOLOTYPE: QM S20629, Lamington NP, Echo Point, 28°15'S 153°10'E, SE.QLD, rainforest, intercept flight trap, 27 Dec 1991-24 Mar 1992, G. Monteith. Paratypes: QM S46399, 3 same data but 24 Mar-24 May 1992, G. Monteith; QM S9054, male, Lamington Plateau, Lookout Point, 28°15'S 153°08'E, SE.QLD, rainforest, 30 Nov 1976, R. Freeman. QM S9340, Upper Tallebudgera Valley, 28°14'S 153°16'E, SE.QLD, rainforest, Mar-Jul 1985, D.J. Cook; QM S15424, Nothofagus Mt, 12km N Woodenbong, 28°17'S 152°36'E, NE.NSW, rainforest, pitfall, 1981-1982, G. Monteith; QM S8928, Victoria Pk, via Alstonville, 28°53'S 153°22'E, NSW, rainforest, pitfall, 23 Mar-3 Aug 1975; QM S9102, same data but 3 Aug-16 Nov 1975, G. & S. Monteith. QM S9181, Upper Tallebudgera Valley, 28°14'S 153°16'E, SE.QLD, rainforest, pitfall, 8 Jan-17 Mar 1985, G. Monteith, G. Thompson, D. Cook.

DIAGNOSIS. Males differ from those of *M. monteithi* and other described males of *Misgolas* in the triangular secondary apophysis on the palpal tibia and from *M. bithongabel*, sp. nov. in the strong coupling spur on tibia I.

DESCRIPTION. Holotype QM S20629. *Colour in alcohol.* Carapace orange brown, eyes with black edges but entire region not dark; chelicerae darker. Abdomen dorsally fawn with irregular brown flecks forming one anterior large paired and two small larger paired pallid zones; ventrally pallid with few brown spots forming irregular median band. Legs orange brown, without darker areas.

Carapace. Almost glabrous, few silver hairs intermixed with short bristles on interstrial ridges and caput ridge; 3 strong bristles in posterior striae and broad band along posterior carapace margin. Lateral margins with single line of short strong black curved bristles. Fovea wide, straight. Seven short weak anteromedial bristles. Three long recurved bristles in front of AME.

Eyes. Front row wider than back row.

Chelicerae. Rastellum strong: line of 4-5 short thick spines from inner edge to half fang width, two smaller but thick conical spines laterally and 4 above spines on inner corner along inner cheliceral edge. Furrow promargin with 9 irregularly spaced teeth, retrobasally for basal half a line of 4 larger distal and 3 smaller teeth basally. Interchelical tumescence not evident.

Labium, maxillae. Like *A. longipes*. Labiosternal sigilla uniformly wide with folded adjacent sternal edge medially.

Sternum. Sigilla: all oval. Sparsely setose and almost devoid of hairs, except marginally.

Legs. Tibia I with medium-sized distal coupling spur with two conical spines on lower distal mound and 3 short, broad spines on subdistal lobe; metatarsus I distinctly bowed prolaterally deepest at basal third.

Scopula. Scopulate areas of I, II amost asetose, pallid. Long hairs, moderately dense, and extending to lateral edges for distal fifth of metatarsi I, II; scattered hairs only on III. Full, entire but short on tarsi I, II, absent on III, IV.

Spines. I: fe 0; pa 0; ti v1.2.2; me v1.1.1.1.3; ta pv6rv11. II: fe 0; pa 0; ti p2 v7; me p1 v2.2.1.2; ta pv6rv11. III: fe 0; pa p3; ti p2r2v1.1.4; me p3r3v10; ta pv8rv15. IV: fe d3wr3w; pa 0; ti r4v7; me r3v13; ta pv12rv13. Palp: fe 0; pa 0; ti only on process; ta *ca.* 25 long weak spines across distal dorsal half.

Claws. I: STC with long sinuous row from distally ental to basally mesal; all 9 teeth of similar size; ITC slightly curved, bare. IV: like I.

Palp. Tibia slightly flattened laterally with strong distally directed RTA in apical third; process lies within a line off end of tibia; ventral half of tibia and inner edge of process setose. Tibial apophysis conical, with slightly incrassate base anteriorly, forming sharp V-shaped groove with distal process; c.40 short blunt pointed spines forming no evident pattern over distal surface, very few in groove; distal process with distinct spinose rounded ridge with 3-4 large conical spines medially, 8 smaller spines distally and 15 basally; distal process forms tip; embolus with long grooved tip; unsclerotised ventral near base of tibial apopohysis with distinct unsclerotised ental mound bearing two long setae. Cymbium with distinctly narrowed retrolateral lobe with c.25 long spines over distal edge.

ETYMOLOGY. From the type locality.

DISTRIBUTION & HABITAT. Rainforest at Lamington National Park and Upper Tallebudgera Valley, SEQ, and Alstonville and Nothofagus Mt, near Woodenbong, NE NSW.

Misgolas monteithi, sp. nov.
(Figs 11)

MATERIAL EXAMINED. HOLOTYPE: QM S20675, ♂, Lamington NP, Pat's Bluff, 28°14'S 153°08'E, SE.QLD, open forest, 17 Nov 1991, G. Monteith.

DIAGNOSIS. A very large dark idiopid in which the males differ from those of the other species

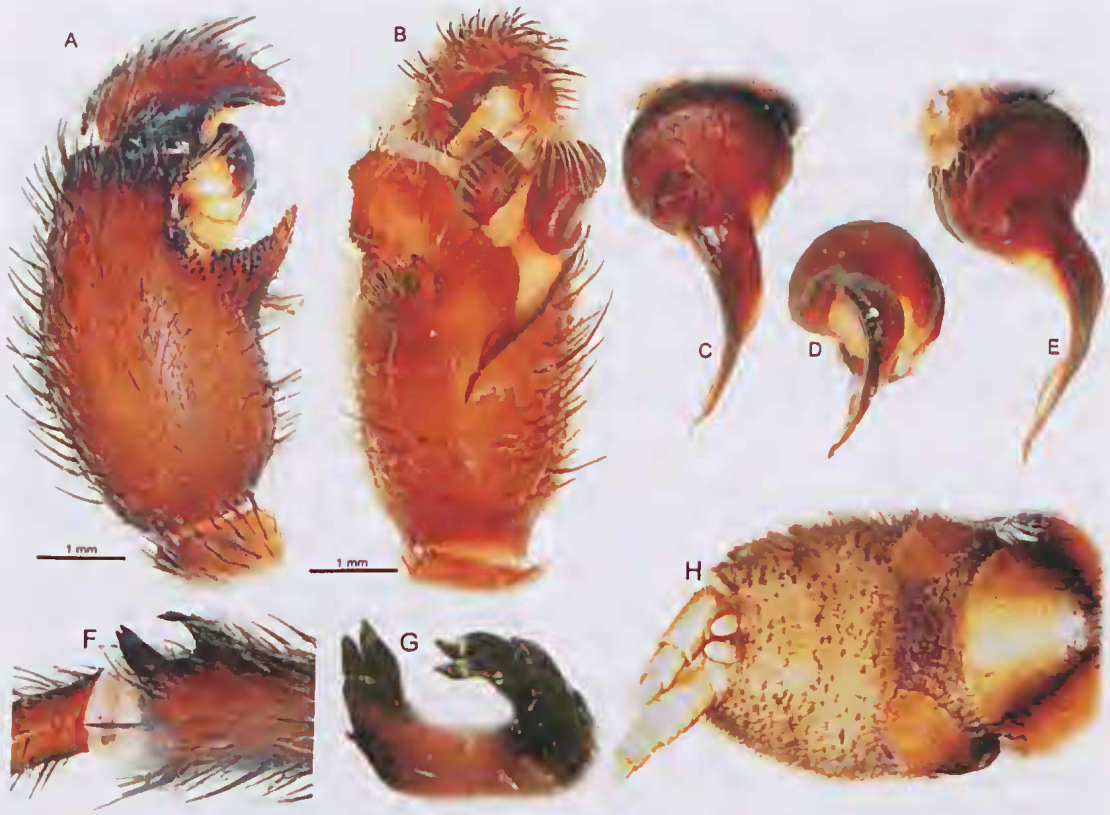

FIG. 11. *Misgolas monteithi*, sp. nov., leg I, palpal tibia, RTA, tarsus and bulb, male. Retrolateral (A) and ventral (B) views; C-E, bulb, rotated views; F, G, tibia, metatarsus and tarsus I, ventral (F) and prolateral (G) views; H, abdomen, ventral view.

with a coupling spur on tibia I by the unique sinuous form of the secondary palpal apophysis (Fig. 11A, B).

DESCRIPTION HOLOTYPE ♂ QMS20675: like *M. echo* except as follows.

Carapace 8.20 long, 7.50 wide. Abdomen 7.90 long, 4.2 wide. Total length, 19.

Colour in alcohol. Carapace red brown; sternum, maxillae and labium orange to red-brown. Abdomen dorsally dark brown anteriorly with large median pale zone flanked by pair of smaller dots behind which are 5 pairs of thin transverse pallid bars; posterior book-lung covers orange between which is blue black zone; otherwise ventrally pallid with brown flecking laterally and less dense but evident medially. Legs red brown with burnt zones (less distinct than in *M. echo* prolaterally and retrolaterally on patellae I, II) without darker areas.

Carapace. Lightly hirsute; 3-5 strong bristles in posterior striae. Lateral margins with short strong curved black bristles in 1-2 irregular lines anteriorly and 3 posteriorly. Fovea wide, straight with recurved ends. Six short weak anteromedial bristles. Three long recurved bristles in front of AME, 2 on clypeal edge, 2 between PME.

Eyes. Group front width: back width: length, 59:50:36; anterior ocular quadrangle front width: back width: length, 59: 33: 20. AME: ALE: PME: PLE, 12: 14: 7: 10. Interspaces as AME diameter: AME-AME, 0.6; AME-ALE, 0.4

Chelicerae. Rastellum strong: line of 4-5 short thick spines from inner edge to half fang width and 4-5 thick conical spines 4 above those. Furrow promargin with 8 teeth, retrobasally for basal half a line of 8 larger distal and 3 smaller teeth basally. Interchelical tumescence a large ovoid area, pallid ventrally.

Labium, maxillae. Like *M. echo* but *ca.* 40 pointed cuspules in narrow band in anterior ental corner.

Sternum. Sigilla: all oval. Strong uniform cover of bristles and setae.

Legs. Tibia I with medium-sized distal coupling spur with two straight conical spines on lower distal mound and 2 short, broad sinuous spines on subdistal lobe; gap so formed = diameter of base of distal mound; metatarsus I slightly bowed laterally; tarsus IV bowed dorsoventrally.

Scopula. On tarsi I, II, dense, full, entire but short and weak for length of III, IV; on metatarsi I, II, dense for distal 5/6, and weak in distal sixth of III, IV.

Spines. I: fe d1w; pa 1w; ti p1v1.1.1.2; me v1.2.0; ta 0. II: fe p1d2w; pa p1; ti p2v2.1.1.2; me v1.3.1.1.1.3; ta pv0rv9. III: fe 0; pa p14 thorns; ti p2r3v2.2.4; me p3r5v2.2.1.2.2.1.1.4; ta pv9rv10. IV: fe d3w; pa 0; ti r7 in line v9w; me r4wv12 d4 strong; ta pv12rv13. Palp: fe 0; pa 0; ti only on process; ta *ca.* 25 long weak spines across distal dorsal half.

Claws. I: STC with long sinuous row with 4 distal shorter teeth and crest of 5 teeth basally: basal crest with smallest tooth basally, more distal teeth longer such that second basal already as long as distal group of 4 and distal 3 of crest longest and recurved. IV: like I but 3 in distal group and 4 in basal crest with most basal tooth absent.

Palp. Tibia barrel-shaped, laterally rounded, not flat. Small, slender pointed horn-like RTA distally concave, basally convex with distinct groove at secondary apophysis, secondary apophysis a curved (ventrally concave) sinuous horizontal ridge, basally with rounded mound narrowing quickly to saddle ridge then widens laterally and horizontally into ventrally flattened shield. Spines on RTA uniform in size, *ca.* 2-4 times longer than wide in broad triangular area only on distal concavity of RTA with 20-30 thorns apically; 10 coniform spines in valley; *ca.* 20 on ventral face of basal secondary apophysis and just onto distal ridge and 2-3 onto adjacent flat face. Cymbial lobe coniform; 20-30 long straight attenuate spines dorsally on cymbium. Bulb with small unsclerotised median haematodocha but continuous with weakly sclerotised area extending to embolus tip; embolus distally twisted, apically bifid, basal lobe and main lobe similar.

Spinnerets. *ca.* 10 large pumpikiniform spigots on PMS, less on basal and middle segments of PLS.

Posterior Book-lungs. Covers 2.00 wide, 1.50 long; aperture 1.17 wide, 0.10 deep.

DISTRIBUTION & HABITAT. Open forest at Pat's Bluff, Lamington National Park, SEQ.

ETYMOLOGY. For Geoff Monteith.

REMARKS. *M. monteithi*, sp. nov. closely resembles a similar large new species of *Misgolas* found throughout southeast Queensland in lower altitudes and onto the lowlands, notably heath.

DISCUSSION

Significance of "burnt" brown decorations. The lateral decorations were noted in *Misgolas robertsi* by Main & Mascord (1974) and (Main, 1985a) in *M. rapax*. Wishart (1992) reported them in *M. hubbardi*, *M. dereki*, *M. kirstiae*, and *M. mascordi*. They are one of the diagnostic characters of females of *A. longipes* but they are widespread but not universal in *Misgolas* (GW). Apart from *A. longipes*, they are here reported also in *A. beaury*, sp. nov. and *A. robertcollinsi*, sp. nov. When present, the dark areas are distinct but interspecifically vary in distribution on the legs (usually I, II and palp), faces (usually both retrolateral and prolateral) and articles (femur, patella, tibia) on which they are present. Also, the height of the decorations relative to the overall height of the lateral face varies. The decorations are less evident in life than in alcohol, at least in *A. longipes*. After an exhaustive examination of Australian idiopids (by RJR) in collections of Australian museums, we can report the decorations are unique to *Arbanitis* and *Misgolas*. Hence, we suggest that the presence of the decorations is phylogenetically informative and may be a synapomorphy of both genera. In species included in *Misgolas* in which they are absent, they may be, of course, secondarily lost. That hypothesis will be tested by other characters.

Burrow construction behaviour as a synapomorphy. The use of behavioural characters in araneid systematics has a long history, principally in web type in the Araneoidea (e.g., Scharff & Coddington, 1998). However, except for the many hypotheses of Main (1981), their use in mygalomorphs has been minimal. A notable exception was Raven (1985) who hypothesised that differences—in relative leg strength, leg spination, eye tubercle, caput and rastellum development, and possibly also spinnerets—between the deep basal groups, Fornicephalae and Tuberculotae, were

associated with differences in burrowing habits. The Tuberculotae show little differentiation between the first and fourth legs, a raised eye tubercle, low caput and little rastellum development with weak dorsal spination of legs. In contrast, the Fornicephalae have strongly differentiated legs I and IV, the eye tubercle is low, the caput is high, spines dorsally on the legs III, IV are stronger than ventrally and rastellum development is almost universal.

Main's underlying hypothesis, centred on the Idiopidae, is that burrow structure and associated behaviour is taxonomically and presumably also phylogenetically significant (Main, 1957). In general, burrow construction was considered to correspond with morphological differences between genera. Most notable was the thick plug trapdoor of *Euoplos* (formerly *Arbanitis)* compared with idiopids in which no door is used. A more refined difference lay in the separation of *Cataxia* and *Homogona*, the former builds a half-moon-shaped and often ornate door, whereas in *Homogona*, it is a soft flap—clearly the origin of the door.

In *Arbanitis* and *Misgolas*, four burrow entrance types are known, all lack a door. In the species termed "Tube spiders" (*M. robertsi* and *M. mascordi*), the burrow is significantly extended above the ground, held upright by its attachment to saplings, trunks, roots or rocks. In the *A. longipes* group, the burrow entrance is basically flush with the ground. In *M. rapax* and *M. hubbardi*, the "burrow has a rigid, funnel-like entrance; the lip is always oblique at an angle of between 30° and 80° in the manner of a hood and is disguised and strengthened with attached leaves and other small pieces of vegetation" (Wishart, 1992). In *M. kirstae* Wishart, 1992 and *M. gracilis* (Hogg), the entrances have a soft flap door, as in *Homogona*. The differences do not correlate with either the reduction or absence of a spur on tibia I or the rounded cymbial lobe on the male palp; flush entrance burrow builders occur in both groups. However, the stalked burrow of the Tube spiders may be the synapomorphy of a group.

Matching conspecific males and females of sympatric congeners in somatically homogeneous groups. In most spider families, at least two species occur in sympatry but usually matching conspecific males and females presents little problem as they belong to somatically distinct genera. However, many spider genera are diagnosed on characters found only in adult males (e.g., Davies 1998; Platnick, 2000). Sexual dimorphism in spiders is often quite strong affecting not only "primary" sexual characters (e.g., female epigyne and male palp through which sperm is indirectly transferred), but also spinnerets (e.g., Platnick, 1990), cheliceral development (e.g. Forster, 1970), leg spination (e.g., Raven, 1994), and carapace shape (e.g., Grostal, 1995), as well as abdominal scute development (e.g., Platnick, 2000). Strong sexual dimorphism is present in Araneomorphae (e.g., Davies & Raven, 1980) but often not problematic in this context.

In contrast, in the highly somatically homogenous mygalomorphs, problems generated by sexual dimorphism may become quite acute. In hexathelids, Raven (1978) found strong differences in males and females in carapace setation and leg spination (apart from that of the coupling spur on leg I). However, only in one case did a possible problem appear. Two apparently sympatric species of *Paraembolides*, *P. polesoni* (Raven, 1978) and *P. lugubris* (Raven, 1978), were almost identifical in the shape of the bulb and spination of the male palpal tibia but differed strongly in abdominal pattern and foveal bristles. The species later proved to be closely parapatric in adjacent open forest and rainforest at New England National Park, northeastern New South Wales. That case was unusual in that sexual differences were not useful, even between males of different species, but somatic differences were.

Difficulties arise when no habitat difference is known, i.e., species are sympatric in the same forest. One of us found that matching congeneric males and females of four sympatric species in *Misgolas* at Gerringong (Wishart, 1992) presented a challenge. Characters used to match conspecific sympatric males and females (as well as the widely allopatric *Misgolas mascordi*) were spination of retrodorsal metatarsus IV and ventral abdominal pattern. There were also differences in rastella.

The issue herein was somewhat simplified with *Arbanitis longipes* because long term pitfall trapping at several localities yielded males of only *A. longipes* which was taken as evidence that only one species was present. At Rochedale State Forest, a male and female of a second species were also taken but clear differences between them and those of *A. longipes* were evident. However, the related problem arose when attempting to separate females of *A. longipes* from those of the putative sister species *A. robertcollinsi*. Equally, on Lamington Plateau,

although three species (*Misgolas echo*, *M. monteithi*, *M. bithongabel*) are known only from three different localities (Echo Point, Pats Bluff, Mt Bithongabel, respectively), the fourth (*Arbanitis robertcollinsi*) has been found more widely but is not known to be sympatric with the others. The fourth also appears very commonly in pitfall traps.

The use of pitfall trap data to establish what males are in the area is not foolproof because males of arboreal mygalomorph spiders (e.g., *Migas*, *Sason*) do not feature commonly in pitfall traps (QM spider database). However, if males are takcn in pitfall traps (as for all new species herein), then it is likely that females are ground dwelling. However, the corollary—that males most commonly encountered in traps are conspecific with the most commonly seen females—is not equally valid.

Males of *A. robertcollinsi* are amongst the smallest idiopids on Lamington Plateau and the dorsal abdominal pattern is distinct, at least in ethanol. However, the most evident burrows at Binna Burra, Springbrook and O'Reillys are those of a large tube-building female with no evident pattern in life or dcath.

Populations and differences. Bond et al. (2001) claimed absence of [quantifiable] morphological difference bctween genetically divergent populations of a Californian cyrtaucheniid, *Aptostichus simus* (Chamberlin 1917). For the estimation of morphological difference they used only females and a number of non-specific morphometric characters and ratios from them, i.e., relative dimensions of carapace, sternum, sigilla, labium, leg I, labial and maxillary cuspules, spines on the rastellum, and patella and tibia III, and cheliceral dentition. No reason was given for the choice of characters, they are simply characters that have been recorded in descriptions of mygalomorph. As we havc shown here in *Arbanitis longipes* and seen also, for example, in Raven (1994), differences in females are not always reflected in that set of characters but are present in characters specific to the genus, e.g., basifemoral thorns, colour pattern. Equally, those smaller differences in femalcs are correlated with strong and quantifiable differences (spination of tibial apophysis, scopula on tarsi) when the male palp is used but Bond et al. (2001) did not use males.

In *Arbanitis longipes*, at least two distinct populations with diagnostic characters in the extent and number of ranks of spines on the RTA of males have been identified. As indicated above (Variability), the type population is readily diagnosable from that at Mt Tamborine (Fig. 4F) by the less numerous spines. However, populations at Beechmont, Beerwah, Bahrs Scrub and Flinton Hill, have fewer spines with very well separated ranks (Fig. 4). Remarkably, the latter morphotype is geographically interspersed between that of the type form. No characters have been found in females to support the differences in males and clearly a much more intensive study is needed.

Euoplos Rainbow, 1914

Euoplos Rainbow, 1914: 217. Type species by monotypy *Euoplos spinnipes* Rainbow, 1914.

Evoplos: Bonnet, 1956: 1892. Incorrect emendation followed also by Main (1985a, b).

Tambouriniana Rainbow & Pulleine, 1918: 120. Type species by monotypy, *Tambouriniana variabilis* Rainbow & Pulleine, 1918. First synonymised with *Arbanitis* by Main, 1985a.

Albaniana Rainbow & Pulleine, 1918: 122. Type species by subsequent designation of Petrunkevitch (1928:63), *Albaniana inornata* Rainbow & Pulleine, 1918. First synonymised with *Arbanitis* by Main, 1985a.

Bancroftiana Rainbow & Pulleine, 1918: 127. Type species by monotypy, *Bancroftiana speciosa* Rainbow & Pulleine, 1918. First synonymised with *Arbanitis* by Main, 1985a: 22.

Armadalia Rainbow & Pulleine, 1918: 129. Type species by subsequent designation of Petrunkevitch (1928:63), *Armadalia ornata* Rainbow & Pulleine, 1918. First synonymised with *Arbanitis* by Main, 1985a.

DIAGNOSIS. Differs from all other Australian idiopids by the broad carapace with clearly procurved fovea in males (Eastern Australia) and females; males of Western Australian species may have a straight fovea but have retained the unique broad carapace. Males differs from those of *Misgolas* and *Arbanitis* in the broadly keeled embolus.

Four spinncrets. Eye group as wide behind as in front or wider. Rastellum present in females. Sternum posteriorly broad. Tarsi I, II of males ventrally incrassate, pallid and scopulate. Enlarged dorsal abdominal sigilla absent.

TYPE SPECIES. *Euoplos spinnipes* Rainbow, 1914 by monotypy.

SPECIES INCLUDED

Mygale annulipes C.L. Koch, 1842 . . . . . TAS
Arbanitis bairnsdale Main, 1995 VIC
Arbanitis ballidu Main, 2000 . . . . . WA
Arbanitis festivus Rainbow & Pulleine, 1918 . . . . . WA
Cantuaria hoggi Simon, 1908 . . . . . WA
Albaniana inornata Rainbow & Pulleine, 1918 . . . . . WA
Albaniana ornatus Rainbow & Pulleine, 1918 . . . Qld
Arbanitis mcmillani Main, 2000 . . . . . WA

Albanitis similaris Rainbow & Pulleine, 1918 . . . . . Qld
Euoplos spinnipes Rainbow, 1914 . . . . . Qld
Aganippe tasmanica Hickman, 1928. . . . . Tas
Tambauriniana variabilis Rainbow & Pulleine, 1918. . . . . Qld, NSW
Arbanitis victariensis Main, 1995 Vic
Armadalia zorodes Rainbow & Pulleine, 1918 . . . . . SA

REMARKS. In E Australia, the fovea of males and females of *Euoplos* are strongly procurved. However, males of Western Australian species herein included in *Euoplos* have a straight fovea (Main, 2000 and pers. obs. RJR); that suggests that *Albaniana* may be validly restored for those species. However, a cladistic hypothesis is required before making such changes and that is beyond the scope of this work.

DISTRIBUTION. Coastal E and SW Australia.

CLADISTICS

The following taxa were used as ingroup: *Arbanitis longipes*, *A.beaury*, *A.robertcollinsi*, *Misgolas echo*, *M. monteithi*, *M. hubbardi*, *M. dereki*, *Euoplos variabilis*, *E. similaris*, *Homogona pulleinei* Rainbow, *Cataxia spinipectoris* Main, 1974. The theraphosid, *Chaetopelma* and the cyrtaucheniid, *Kiama*, were used as outgroups.

Characters were taken only from males, with the exception of burrow type, which is taken from females where known.

1. Median haematodocha: 0, normal, slit-like; 1, extensive.

2. Bipartite coupling apophysis on tibia 1: 0, present; 1, absent

3. Bipartite coupling apophysis on tibia 1: 0, strong; 1, weak

4. Cymbial lobe: 0, rounded; 1, acute

5. RTA spines: 0, absent; 1, disordered; 2, in distinct curvi-linear ranks

6. Basal mound on RTA: 0, absent; 1, present

7. Spines on male palpal tarsus: 0, present, strong; 1, absent; 2, weak spines.

8. Fovea: 0, straight; 1, recurved; 2, strongly procurved

9. Eye group: 0, about twice as wide as long; 1, as wide as long; 2, about 1.5 times wider than long.

10. Eye group: 0, about as wide in front as behind; 1, clearly wider in front; 2, clearly wider behind.

11. Secondary apophysis: 0, absent; 1, present.

12. Secondary apophysis: 0, a low tear-shaped lobe in profile; 1, long triangular lobe; 2, a broad-based tapering sinuous lobe; 3, long conical and apically hooked.

13. RTA spine length: 0, absent; 1, all or most short, conical; 2, most at least 3-4 times longer than wide.

14. Embolus tip: 0, pointed; 1, flared

15. Carapace shape: 0, long narrow; 1, broad wide.

16. Decorations on legs: 0, absent; 1, weak; 2, strong.

17. Burrow door: 0, absent; 1, thin, wafer-like; 2, thick plug

18. Male, tarsal spines on 1: 0, few to absent; 1, many strong.

19. Carapace colour: 0, yellow brown; 1, dark brown

20. Caput elevation: 0, low; 1, arched.

21. Embolus shaft: 0, tapers for length; 1, with flared portion

All characters were treated as unordered and equally weighted. The use of unordered characters is notionally an acceptance of the Principle of Indifference (Wilkinson, 1992); most characters used here could be ordered although convention has opposed it.

NONA 2.0 (Goloboff, 1997) was used through Winclada 1.00.08 (Nixon, 2002) with the settings mult*1000, with 1000 replications and 25 starting trees per replication. Six equally parsimonious trees were found (length, 42 steps; ci=0.69; ri=0.78) was found in which the five groups were common to all trees: the three *Arbanitis* species are monophyletic and always basal in position; *Homogona* is the sister group of *Cataxia*; the *Euoplos* species are monophyletic; *Misgolas monteithi* and *M. dereki* are consistently the sister group of *M hubbarbi*; and all idiopids except *Arbanitis* form a monophyletic group. The Nelsen consensus tree is given (Fig. 12) (length, 45 steps; ci=0.64; ri=0.73) Differences in the six cladograms lie entirely with the positions of the *Misgolas bithongabel* and *Misgolas echo* and the relationships within the clade of the genera.

Misgolas was not monophyletic in any cladogram. Showing monophyly of *Misgolas* is not one of the objects of this analysis. This was only a small group of species representing many known but undescribed in *Misgolas*. In 2004, Raven (unpublished) surveyed morphological diversity of all male mygalomorphs in museum collections in Australia and found that although the idiopids provide a rich diversity of diagnostic

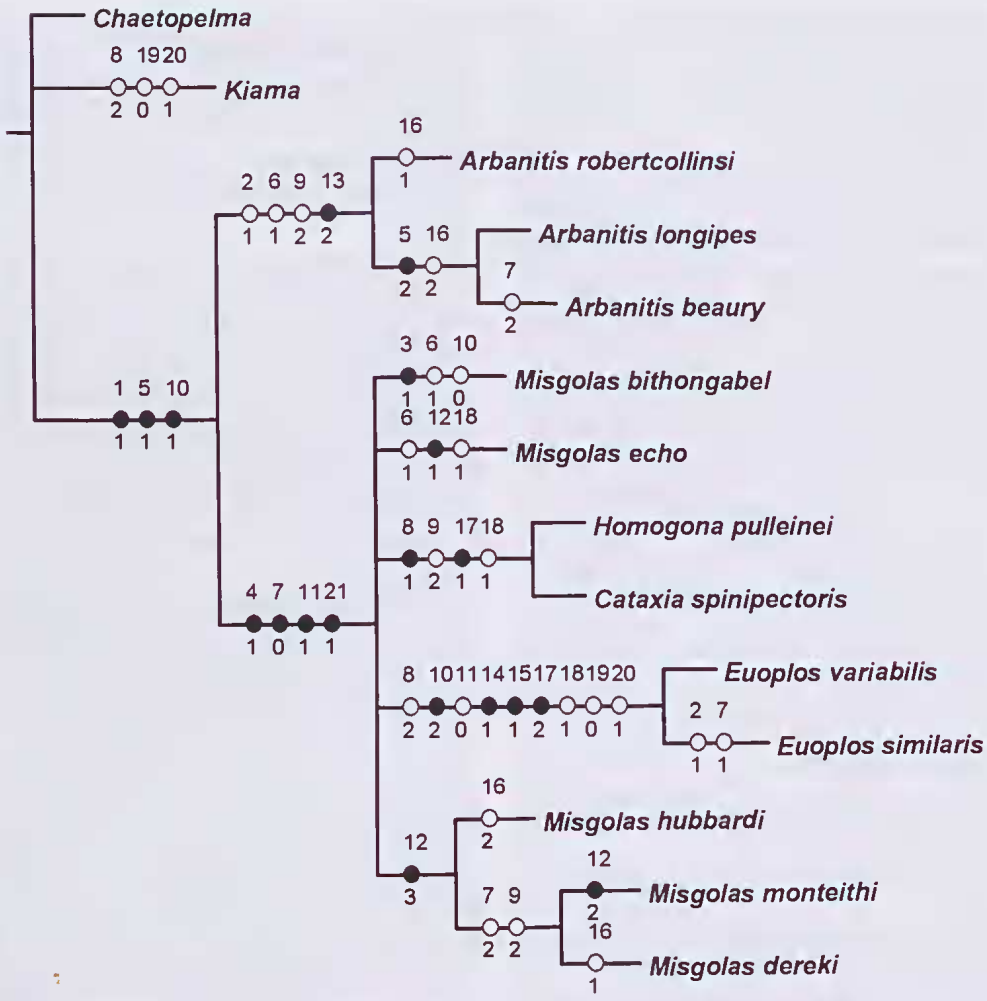

FIG. 12. Cladogram of Nelsen consensus tree; character states marked with solid dots squares are non-homoplasious and unambiguous changes. All unsupported nodes are shown collapsed.

characters, homoplasy is rife in most characters. Hence, numerical phylogenetic analysis of the bigger group will presumably not reflect what has been thought to be natural groups (i.e., genera) and only use of the original Hennigian method will produce a result that is acceptable.

In summary, *Arbanitis* species are rendered monophyletic and are the sister group of the combined genera, *Euoplos, Misgolas, Homogona* and *Cataxia*.

The cladogram places *Arbanitis* as the most plesiomorphic of the Arbanitinae, at least those of eastern Australia. The absence of the pointed cymbial lobe in *Arbanitis*, one synapomorphy of the Idiopidae (Raven, 1985) can either be taken as a homoplasy (i.e., reversal) or as indication that *Arbanitis* should lie basally in the Idiopidae with the pointed cymbial lobe the synapomorphy of all other idiopids. The absence of the male coupling spur in *Arbanitis*, considered by Raven (1985) to be the synapomorphy of the Genysinae + Arbanitinae, implies that *Arbanitis* should be their sister group. (As Main, 1985a had indicated, the tibial spur can be absent within genera, like *Euoplos* among others; that is taken to be a secondary loss.) In that case, the senior family group name for the Australian idiopids is Aganippinae Simon. Until a cladogram including the taxa here used, plus the Gensyinae and

FIG. 13. Distribution of *Arbanitis* (A), and *Misgolas* (B) in southeastern Queensland and northern New South Wales

Idiopinae, supports that hypothesis no change is required.

BIOGEOGRAPHY

The distribution of *Arbanitis* reported here is from the MacPherson-Macleay overlap and adjacent lowland areas including forests around Brisbane, Moreton Island and Beerwah heath with an outlier west in the Great Dividing Range in northern New South Wales. The cladogram shows *A. robertcollinsi*, from the Lamington Plateau, to be the sister group of all other species and hence the most plesiomorphic species in the genus. Hence, both *A. longipes* and *A. beaury* may have diverged at least by the Eocene as the rainforest contracted to the mountain tops.

The cladogram also implies that that Lamington Plateau is home to the most plesiomorphic genus, *Arbanitis*, in the Idiopidae. That may, at first, seem incongruous; such plesiomorphic taxa are usually found first in Tasmania and New Zealand. However, one of the localities in the distribution of *Arbanitis* — Lamington National Park—is one of the last surviving locations of *Nothofagus* in Australia. In any case, a number of plesiomorphic spider groups occur in sympatry with *Arbanitis robertcollinsi*: the four-lunged araneomorph family Gradungulidae is found in rainforests in the region, along with relict parts of eastern Australia (Forster et al., 1987). Raven (1995) found that the most plesiomorphic state, viz. outlets on legs I, II and IV, of the coxal glands in any known chelicerate occurs in the hexathelid *Bymainiella terraereginae* (Raven, 1976) from the same plateau.

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APPENDIX

Data matrix for cladistic analysis. Character 0 is deactivated.

TAXON	CHARACTER STATES
Chaetopelma	000000 -1000 0—00 000100
Kiania	00—00 -1200 0—00 000010
Euoplos variabilis	010011 00202 0-111 021011
Homogona pulleinei	010011 00121 10100 011101
Arbanitis longipes	011-02 11021 0-200 200100
Arbanitis robertcollinsi	011-01 11021 0-200 100100
Arbanitis beaury	011-02 12021 0-200 200100
Misgolas monteithi	010011 02021 12100 000101
Misgolas bithongabel	010111 10000 10100 0?0101
Misgolas hubbardi	010011 00001 13100 200101
Misgolas dereki	010011 02021 13100 100101
Misgolas echo	010011 10001 11100 0?1101
Euoplos similaris	011-11 01202 0-111 021011
Cataxia spinipectoris	010011 00121 10100 011101